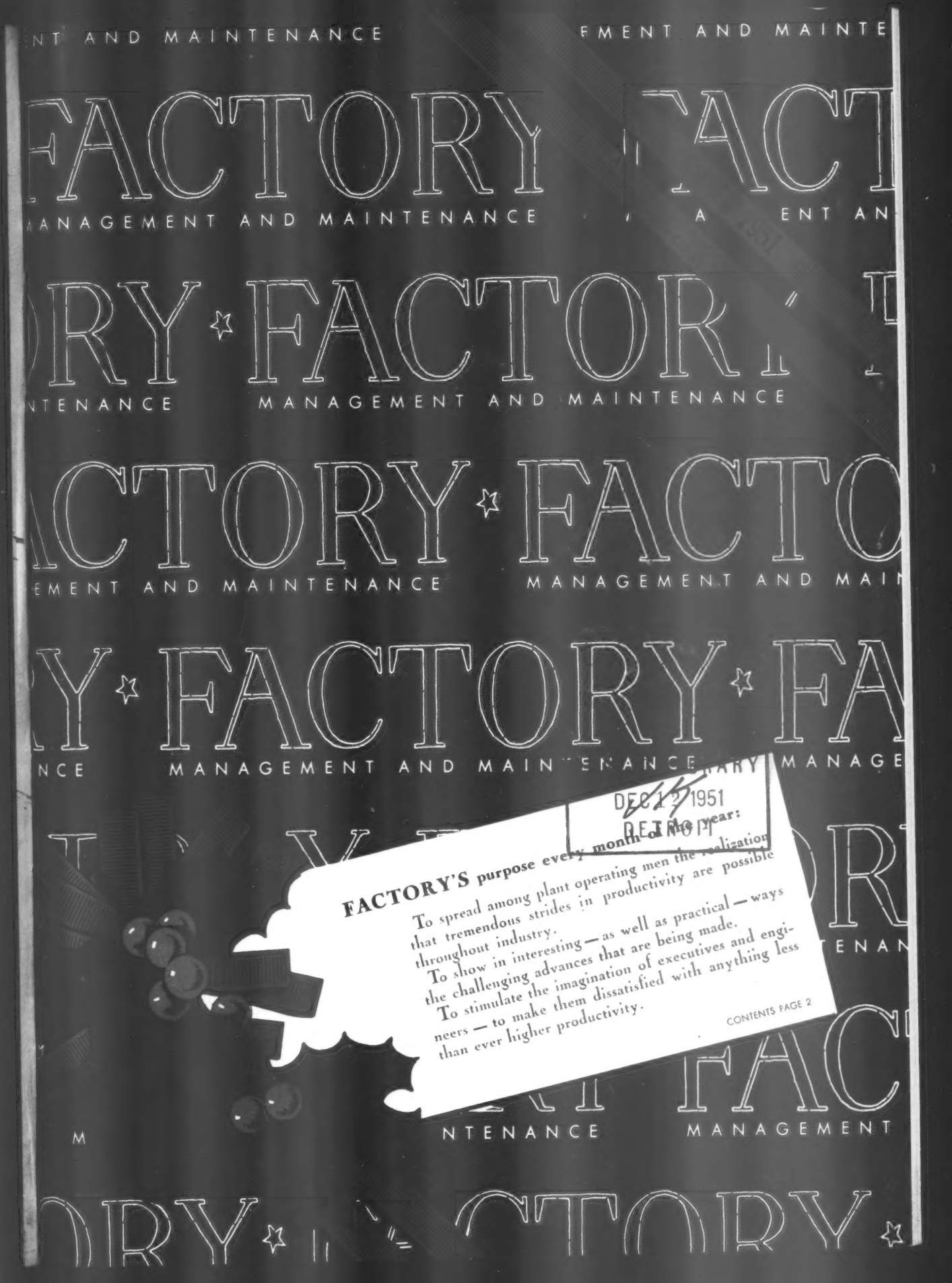

DEC 12 1951

FACTORY'S purpose every month of the year:

To spread among plant operating men the realization that tremendous strides in productivity are possible throughout industry.

To show in interesting—as well as practical—ways the challenging advances that are being made.

To stimulate the imagination of executives and engineers—to make them dissatisfied with anything less than ever higher productivity.

CONTENTS PAGE 2

Original troughing idler with plain bearing and grease cup.

Converted troughing idler with Fafnir Sealed Ball Bearing Unit.

20% power saving that's right "on the ball"

HERE'S HOW General Mills in Duluth, Minnesota realized important advantages from a simple bearing conversion on a grain conveyor.

THREE YEARS AGO, the grain conveyor was in need of a complete overhaul. Its old-fashioned babbit bearings, and 1⅛" shafts on which they were installed, were badly worn for the most part. Before making replacements, however, a Fafnir Industrial Distributor was consulted. As a result, only 200 troughing idler bearings were replaced . . . and these with Fafnir Countershaft Boxes. The boxes were mounted on the old shafts reground to accommodate a box of standard shaft dimensions.

RESULTS! In addition to the substantial saving gained by the utilization of existing shafts, the following advantages after three years of operation were reported: (1) 20% power saving; (2) maintenance nil; (3) once-a-year lubrication instead of once-a-day; (4) not one Fafnir Unit has required replacement; (5) conveyor service life greatly extended.

YOUR OPPORTUNITY to get similar results may come through the use of Fafnir Ball Bearing Power Transmission Units too. Check with your Fafnir Distributor. The Fafnir Bearing Company, New Britain, Conn.

FAFNIR
BALL BEARINGS
MOST COMPLETE LINE IN AMERICA

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

What can happen when a hose blows

A typical example of B. F. Goodrich improvement in rubber

MANY a "simple" little factory fire turns into a roaring holocaust like this because hose bursts. Fire hose, carefully racked on the wall for emergencies, fails when the emergency hits. Why?

Where hose and coupling meet, tiny cracks in the rubber used to start from the sharp bending when the hose was coiled or racked. Then, when water roared through the hose at high pressure, the cracks spread into breaks and the hose let go.

B. F. Goodrich engineers studied the problem and came up with the idea of adding a reinforcing layer of hard cotton cords buried in the rubber at each end of the hose. These extra end cords protected the tube from splitting or cracking, and the extra thickness made a better seal between tube and coupling.

This B. F. Goodrich development (firemen call it "end protection") made fire hose safer and more effective. Today, firemen spend more time fighting fires, less time fighting hose.

The BFG policy of never being satisfied where improvement is possible — whether in fire hose or other products — makes this example of product improvement "typical". Because it is, you'll find it important, when buying rubber products for your business, to look into improvements BFG may have made in them lately. Ask your nearest distributor. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

B.F. Goodrich
RUBBER FOR INDUSTRY

FACTORY
MANAGEMENT AND MAINTENANCE

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OF PLANT MANAGEMENT
FOR 59 YEARS

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and Audit Bureau of Circulations

ARE HIGHLIGHTED HERE

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68 **"HOW CAN I GET A RAISE?"** Today, you have to start by knowing the rules of the Salary Stabilization Board. The executive director of SSB gives you both the high spots and the low-down. We warn you, he doesn't talk like a bureaucrat. He talks fast, plain, and straight from the shoulder.

74 **WESTINGHOUSE USES A CONTEST AMONG EMPLOYEES** to keep attention focused on its 4-point quality improvement program. Find out how to get a big payoff from a well-rounded, low-cost attack on "quality troubles."

80 **HOW 160 COMPANIES HANDLE THE HOLIDAY POSERS** of work schedules and Christmas parties. High spots from a special survey by Bureau of National Affairs.

88 **DUST, SMOKE, AND FUMES ARE ALWAYS HEADACHES.** Ford's Automatic Transmission Division tackled the sore spots one at a time. Almost any plant will find use for some of the 11 specific solutions.

92 **GETTING FOREMEN STARTED ON COST CONTROL** is a tough problem. Especially when they've never had experience with budgets. Here's an ABC approach that works for Riverside Metals. If you already have departmental cost control, skip this one; if you don't, you shouldn't miss it.

94 **YOU MAY BE WASTING MONEY ON RECRUITING** new employees if you haven't made the same kind of analysis as did Cleveland Pneumatic Tool. How to analyze methods and costs. Plus C.P.T.'s conclusions about it's five different methods: newspapers, radio, TV, direct mail, and employee referral.

108 **HOW DO YOUR PAY SCALES FOR INDIRECT LABOR COMPARE** with manufacturing plants in 11 major labor markets? Here's a summary of surveys made by the Bureau of Labor Statistics—first such figures on indirect labor.

118 **CADILLAC SAVED SCARCE MATERIALS,** in addition to getting low cost, when it installed interlocked armored cable. Complete pictures and dollars-and-cents cost comparison with other types of distribution systems.

COMING IN JANUARY

HOW TO INCREASE MAINTENANCE EFFICIENCY. One of the toughest problems in every plant will be tackled from every angle—organization, training, mechanization, incentives, wage rates, job evaluation, union restrictions, cost control, leadership.

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Fans breeze through the shipping department in this H & D corrugated shipping box

Time spent packing goods for safe shipment often is a sizeable business expense—and with highly seasonal products, packing time can be an actual production bottleneck. The makers of Atlas-Aire fans solved their rush-season packing problem with this H & D corrugated box. Built-up pads replace the time-wasting packings formerly used, and protect the fans so well that damage claims now are negligible.

The Package Laboratory is ready to help with your packing problem, whether you're anxious to reduce packing time, or to cut costs . . . improve display . . . or provide better protection. For booklet, "Package Engineering," write Hinde & Dauch, 5106 Decatur St., Sandusky, Ohio.

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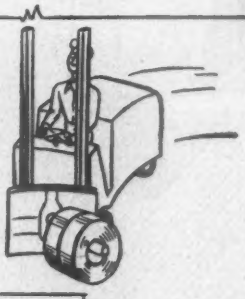
tough tires for tough jobs

MONARCH UNIVERSAL
pressed-on tires

The low ton-mile cost on these babies makes good reading on your cost sheets. Monarch Universals combine exceptional wear resistance with good shock absorption. They're stable, sure-footed, steady on the high lifts.



cut the cost of bumps

MONARCH MONO-CUSHION
pressed-on tires

These big, burly cushion tires literally soak up shock and shock load, reduce vehicle maintenance as much as 40%. They're easy on loads, floors, and drivers, too—cut costs all the way around.

soft touch for floors

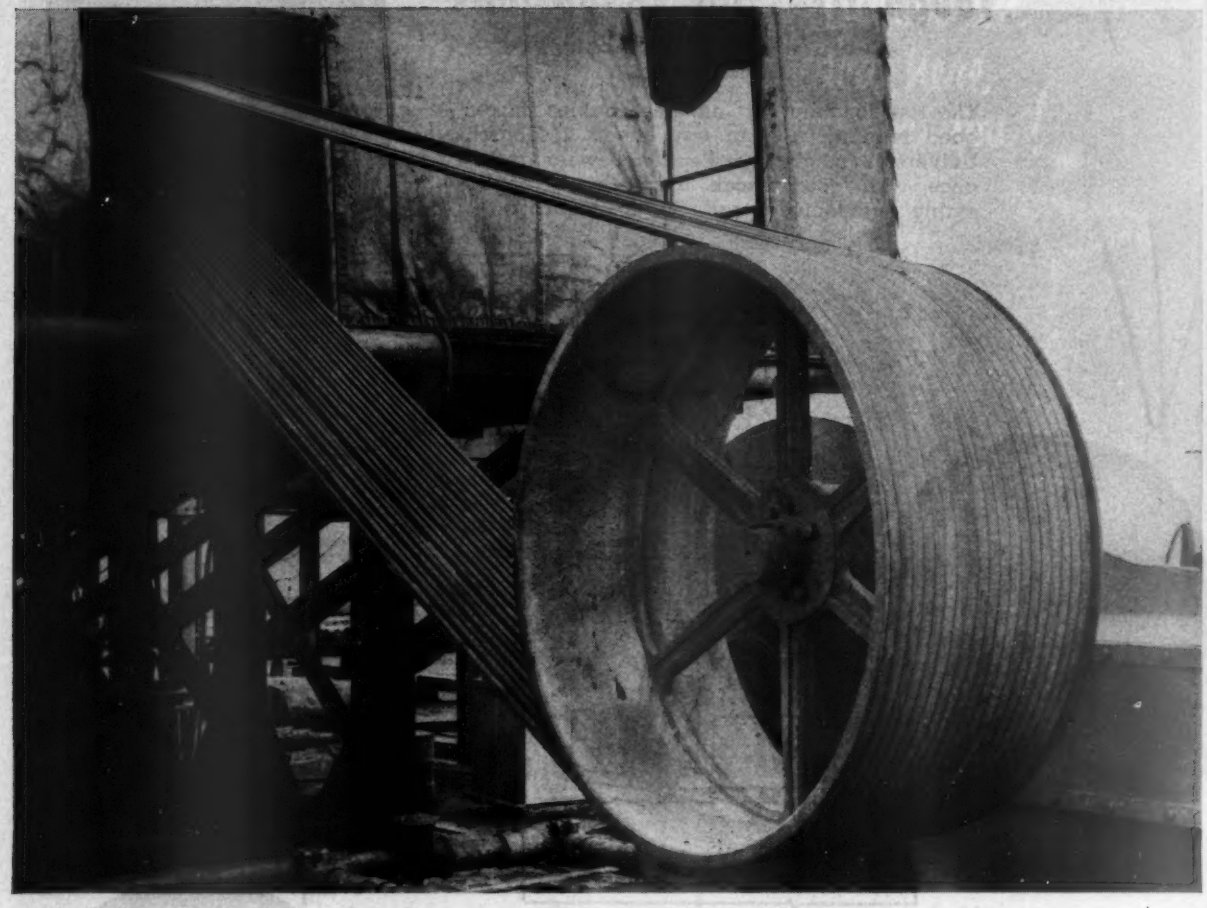
MONARCH CURED-ON
industrial tires

Your hand-powered vehicles pussyfoot silently over your floors on Monarch Tires, never chip or groove floor surfaces. And these long-wearing tires are easy on people — take up "road" shock, make caster wheels swivel easily.

THE MONARCH RUBBER COMPANY
350 LINCOLN PARK • HARTVILLE, OHIO
Specialists in Industrial Solid Tires and Molded Mechanical Rubber Goods

YOUR BEST SOURCE for replacement tires is the manufacturer of your vehicles, who can supply you, through his service branches, with Monarch Tires engineered for your application.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Here B. F. Goodrich grommet belts are saving $104.50 a month

B. F. Goodrich grommet V belts cut costs 20 to 50%

THESE 18 V belts are needed to drive heavy pumps for drilling oil wells. The belts have to operate 24 hours a day, 7 days a week, in all sorts of weather. Ordinary belts couldn't stand the heavy pulling load, couldn't take the strain of round-the-clock operation. They averaged 9 months' life in this kind of service.

Then B. F. Goodrich grommet belts were tried. After 19 months, and drilling wells totaling 76,000 feet deep, these grommet belts look as good today as the day they were installed. Here's why B. F. Goodrich grommet belts can be counted on to save on belt costs:

No cord ends — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet multiple-V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Because a grommet is endless, a grommet V belt is more flexible, grips the pulleys better. Size for size, grommet multiple-V belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich has the grommet!—No other multiple-V belt is a grommet V belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B. F. Goodrich distributor. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Grommet V Belts BY

B.F.Goodrich

RUBBER FOR INDUSTRY

"We Cut Loading and Unloading Costs 75% with a BAKER FORK TRUCK"

"—also saved ourselves a costly construction job" —UNITED STOVE COMPANY, Ypsilanti, Mich.

(Above) This Baker Truck is equipped with a rollover attachment, neatly solving the problem of efficiently loading scrap into trucks for efficient disposal.

(Below) Loads are placed in highway trucks on castered skids from ground level, and pushed into position inside the truck.

● "Since our plant floor, shipping and receiving areas and shop yard are all on the same level, we faced the problem of either building a ramp and dock or finding some other means of getting loads into and out of highway trucks more quickly and economically. A Baker Fork Truck provided the answer. Besides eliminating the need for expensive rebuilding, with the resulting disruption in production, the truck helps us realize up to 75% in our loading and unloading operations, including scrap handling."

So says G. R. Reynolds, superintendent of United Stove Company. This company had been using Baker Trucks successfully inside their plant for many years. It was only natural that they should call on Baker when this new handling problem presented itself.

A Baker Representative will gladly help you solve similar problems in your plant.

BAKER INDUSTRIAL TRUCK DIVISION *of The Baker-Raulang Company*
1218 WEST 80th STREET, CLEVELAND 2, OHIO • *In Canada: Railway and Power Engineering Corp. Ltd.*

Baker® INDUSTRIAL TRUCKS

LINK-BELT RESEARCH AND
ENGINEERING WORK FOR INDUSTRY

BEFORE and AFTER

Contrast laborious hand pouring with Link-Belt mechanization! Pourers now ride on platform conveyor synchronized with mold conveyor. Ladle is suspended from overhead carrier. Note complete absence of smoke and fumes.

YES, foundries now produce better castings at lower cost

And mechanization by LINK-BELT has also made foundries all over the world a better place in which to work

Increased production . . . greater worker productivity . . . reduced labor turnover. Today's modern foundry has accomplished all these through mechanization.

Conveyors eliminate up to 80% of the back-breaking manual lifting and carrying. The floors are far cleaner, and the air far clearer.

Link-Belt foundry specialists have pioneered many of these advances. Preparing sand . . . carrying molds . . . conveying and separating sand and castings — all these jobs are done mechanically, efficiently by Link-Belt equipment.

And the foundry is only one place where Link-Belt research and engineering have played a prominent role. Throughout industry, in factories, mills and mines, wherever wheels turn and materials are moved, you'll find Link-Belt equipment at work.

LINK-BELT

One Source . . . One Responsibility for Materials Handling and Power Transmission Machinery

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities. 12,529

Put Old Equipment "Out to Pasture"

IT PAYS TO KEEP PACE WITH MACHINERY PROGRESS

YOU CAN no longer afford to keep old or obsolete equipment in your plant. Economists predict that costs will probably continue upward. Manpower shortages are likely to remain. Taxes are not likely to decrease.

All this means that a long range, intelligent replacement program aimed at reducing unit costs may be the best way for you to protect your competitive position and your profits. Some companies are now finding they can get more production out of fewer machines operating in a smaller space, following such a program.

Let an Allis-Chalmers representative help you analyze your operations. He may have a suggestion that will help you lower costs. Since Allis-Chalmers builds equipment for nearly every major industry, A-C engineers know equipment and methods that may be able to help you with your particular problem. Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Foundromatic and *Low-Head* are Allis-Chalmers trademarks.
A-3461A

Solids Handling Pump

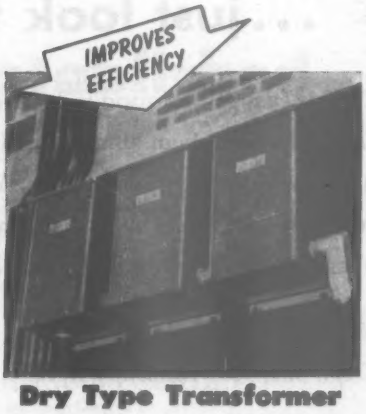
These pumps carry all types of solids from gravel to sticky paper pulp. The special design and special metal alloys of these pumps are a worth while investment. They mean long life under adverse conditions.

***Low-Head* Gyratory Sifter**

It's all metal from top to bottom. Cleaning is quick and easy because all parts can be safely washed. Cuts downtime between product changeovers. High temperature materials can be handled.

Dielectric Core Dryer

Saves drying time! Cores take minutes instead of hours to dry in *Foundromatic* Sand Core Dryer. Cores come out cool, easy to handle, and uniformly dried—need no curing. Cores cannot be overbaked.

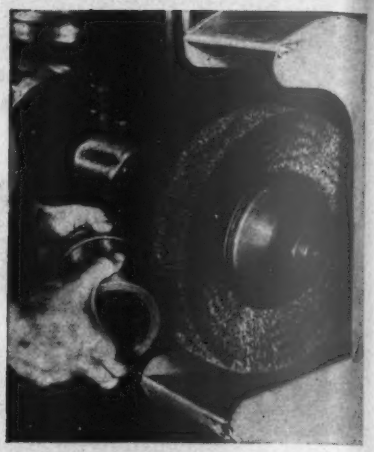


Dry Type Transformer

Full voltage is assured at the load center! Motors operate more efficiently at full voltage . . . heating operations are faster. Transformers are light in weight and easy to install, on machine, on wall, or on rack.

One of the Big Three in Electric Power Equipment—Biggest of All in Range of Industrial Products.

ALLIS-CHALMERS



SIMPLIFIES CLEANING. Osborn power brushes efficiently remove scale, rust, grit, old paint, prepare surfaces for welding . . . deburr metal parts . . . rough up rubber. Built for manual or automatic operation in a wide range of types, sizes and fill materials.

BUILT FOR INDUSTRY by the company that knows Industry's problems, OSBORN Master* Sweep Floor Brushes and other maintenance brushes are designed to do your jobs better—faster.

How to tell *quality* in brushes . . . just look for "OSBORN"

IT is easy to buy good industrial brushes. Just specify "OSBORN" and order them automatically from your Industrial Distributor along with other mill supplies. You are sure to get the best in workmanship and materials. Osborn brushing tools are backed by 59 years of service to industry throughout the world.

Write for handy pocket catalog. *The Osborn Manufacturing Company, Dept. 581, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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FREE HANDY CATALOG.....Describes OSBORN maintenance brushes for every industrial need. Handy pocket size. Write for your free copy.

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a NEW MARK of Long-Established Quality

Since 1878 and the earliest bicycle cyclometer . . . to the present day when counters are built into everything from hay-balers and textile looms to jet planes and gasoline pumps . . . Veeder-Root has been "the name that counts."

Today, Veeder-Root is the world's largest manufacturer of counting and computing devices for mechanical, electrical, and manual operation. And as a symbol of "the name that counts," this trademark has been developed as a hallmark of old-fashioned quality and modern design *in everything that counts.*

So when you buy counters, look for this mark, and remember: V-R stands for Veeder-Root . . . and also for *"Value Received."*

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Montreal, Canada • Dundee, Scotland
Offices and agents in principal cities

Veeder-Root COUNTERS *"Count Everything on Earth"*

Note how snugly truck stores the rolls

Truck can carry and stack rolls horizontally or vertically

Storage doubled with 66% Less Man Hours

Unique roll handling truck also eliminates hazardous work and product damage . . . high versatility gives plus values

WHAT THIS TRUCK DOES

Newspaper publisher uses truck to carry newsprint rolls weighing up to 1600 lbs. Upon receipt, paper is moved to storage and stacked to ceiling. Truck also transfers rolls from one storage area to another, and finally delivers them to press room.

WHY TRUCK IS UNUSUAL

This unique Elwell-Parker stores absolutely snug because it can grasp rolls short of their maximum diameter. Truck can carry and stack either horizontally or vertically. No pallets are required. Clamp pressure is adjustable for various papers and winding tension. Truck also handles other cylindrical objects.

HOW TRUCK PAYS OFF

1 ***100% Greater Storage***—Previously rolls were placed horizontally only 2 high—maximum storage was 130. Now, Elwell-Parker truck uses every inch of space by vertically storing lower rolls and then placing other rolls on them horizontally as illustrated above. Now truck gets 210 rolls in same space and has also opened up a formerly inaccessible area for 50 more rolls. This benefit saved costly plant enlargement.

2 ***Saves 2 Men's Work***—Truck and operator do the same work far more safely than three men could before.

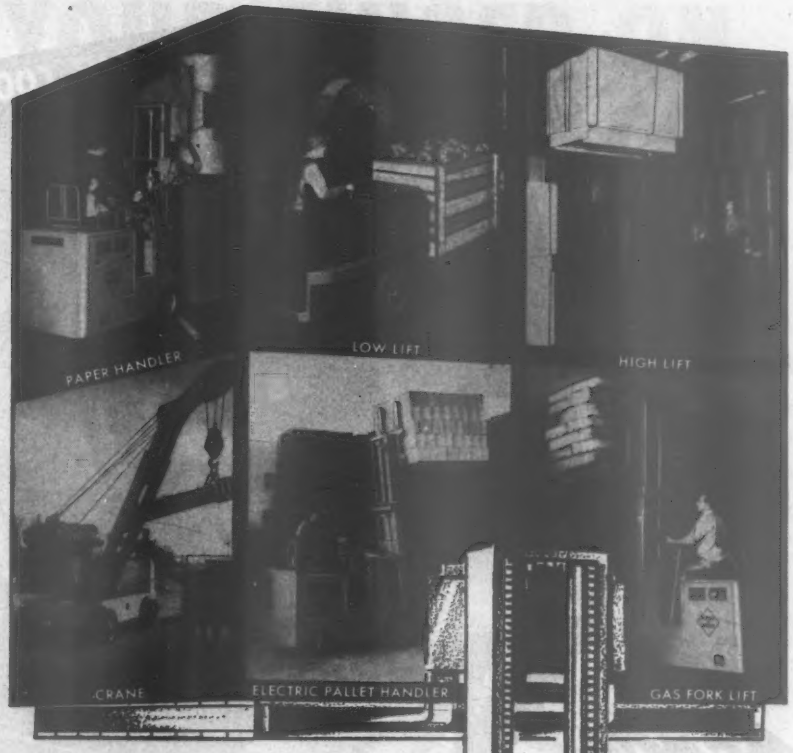
3 ***Many Plus Values***—Besides paper, this truck is kept busy all day long handling baled paper scrap and drums of ink, oil, and linotype lead. By high stacking these loads, impossible previously, more floor space is available for storage. Neatness has also replaced disorder. Speaking of the versatility of this Elwell-Parker, customer says: "We have done everything but eat with it!"

Truck uses its spare time to high tier miscellaneous loads

If you have a similar problem, ask for E-P Reporter No. 8, describing this roll clamp truck. Write The Elwell-Parker Electric Co., 4031 St. Clair Ave., Cleveland 3, Ohio.

ADVT.

Get *Unbiased* Advice on Truck Needs *from* ELWELL-PARKER



because Elwell-Parker:—

1 FURNISHES *ALL* TYPES—Elwell-Parker produces not one or two basic trucks, but *every* type needed to solve varying materials handling problems. There are E-P low-lift platform and high-lift platform trucks, fork trucks, tractors, and mobile cranes . . . available in over 100 different sizes and capacities.

2 SUPPLIES *BOTH* MOTIVE POWERS—From 45 years' experience, Elwell-Parker has learned that electric trucks are best for most jobs—more economical, more durable, quiet and fume-free. Yet, Elwell-Parker also produces gas trucks for installations where such power is advantageous.

3 ENGINEERS *"SPECIALS"*—Not infrequently, the unusual shape or nature of the load requires a specially designed truck. Elwell-Parker has pioneered in this field—that is why owners of mixed truck fleets usually turn to Elwell-Parker for the solution of their special handling problems.

Your near-by MAN is in an unique position to give you *unbiased advice* in the selection of the *right* truck for *your* particular job. Consult him, without obligation. The Elwell-Parker Electric Co., 4031 St. Clair Ave., Cleveland 3, Ohio.

ELWELL-PARKER
POWER INDUSTRIAL TRUCKS
Established 1893

NEW GENERAL CATALOG
describes the complete E-P line in detail. Send for your copy now.

Acme FLOW COLD® liquid chiller

. . . a "jewel" of many facets

Just as the many facets on a perfect diamond are mute testimony to the diamond cutter's skill, so are the many applications of the Flow Cold unit testimony of the skill of ACME design engineers. Wherever you need to maintain temperatures of coolants for any industrial process, the Flow Cold unit is easily adapted. Gives you exact temperature control which means uniform production quality and maintenance of closer tolerances. Can also be applied to the maintenance of solution temperatures in plating, anodizing and welding processes. Increase production quantity and quality through the use of Flow Cold. Moreover, it is the perfect chilling unit for central drinking water systems, and for home, office, or business air conditioning. Write us today!

FLOW COLD UNITS...

- ★ are self contained
- ★ are compact
- ★ are easy to install
- ★ are factory tested and assembled
- ★ are economical
- ★ are efficient
- ★ come in 6 models — 2 to 15 H. P.

ACME also manufactures:

Dry-Ex* Water Chillers, Hi Peak* Water Coolers, evaporative condensers, shell and coil and shell and tube condensers, fin coils, cooling towers, oil separators, liquid receivers, heat exchangers. Write us today for any information you desire about the Flow Cold unit, or about any of the other articles we manufacture.

*Trade Mark

ACME INDUSTRIES, INC., 750 Mechanic St., Jackson, Mich.

Flow Cold Division

CONTINUOUSLY SERVING THE AIR CONDITIONING AND REFRIGERATION INDUSTRY SINCE 1919

PUT YOUR FINGER ON MATERIAL HANDLING COSTS *in Your Own Plant*

There's a way, at last, that can help you "put-the-finger on" today's rising production costs and help get rid of costly bottlenecks.

A simple way that shows how you can step up production and ship more goods faster—*yet cut material handling costs in your plant as much as 50% to 75%.*

Let us send you—free and without obligation—our brand new "Material Handling Analysis Guide" that helps *you* study material handling problems in your own plant . . . and reveals how you can improve material handling efficiency and save money in *your* business.

Don't underestimate your costs of thousands of misspent man-hours. Be wary of these costs that pile up. They are loss-leaks that build up and add needlessly to production costs, costs that eat into your company's profits.

Add Man-Hours to Your Plant's Productive Capacity—Without Increasing Workload of Personnel

Find out how you can join those in all lines of industry who have already found the way to eliminate back-breaking, old-fashioned, hand-handling . . . speed production . . . move more goods faster . . . add to productive capacity without increasing personnel workload.

Cut out the coupon and mail it today. You'll get the brand new "Material Handling Analysis Guide" by return mail.

Wouldn't You Rather
Use One Man Like
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Instead of 3 Men Like
this?
Famous Automatic Electric Trucks lift . . . move . . . and deposit 4,000 and 6,000 pound loads on skids or pallets with simple push-button electric control.
"101"
Transporter
A PRODUCT OF AUTOMATIC
Lightens LIFE'S LOADS

There are more Automatic Transporters in use today . . . than any other operator-led Electric Truck. To our knowledge, every Transporter manufactured is still in service . . . and tens of thousands have been built since 1942.

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Mail coupon for this *brand new* "Material Handling Analysis Guide." *Just off the press!*

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Without obligation, please send me your NEW "Material Handling Analysis Guide," to help *me* study material handling problems *in my own plant.*

Company Name.....

By.....*Title*.....

Street Address.....

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LARGEST EXCLUSIVE BUILDER OF ELECTRIC INDUSTRIAL TRUCKS

How BULK-FLO brings new economies

for feeding—conveying—elevating of bulk materials

Check these 5 ways you benefit from LINK-BELT'S advanced engineering

1. Positive movement of material, with no avalanching on vertical or steeply inclined runs, because *solid flights* substantially cover area of BULK-FLO casing.

2. Gentler handling. Material is protected in individual "compartments," resulting in minimum degradation.

3. Self-cleaning, regardless of amount of material being fed. BULK-FLO lends itself to handling batches of material.

4. Constant speed. Variable speeds are not necessary, because capacity can be varied by regulating feed.

5. Horizontal, inclined, vertical, or combinations of these paths, in a single unit—often requiring less units, in less space at lower cost. Multiple feed and discharge points are practicable.

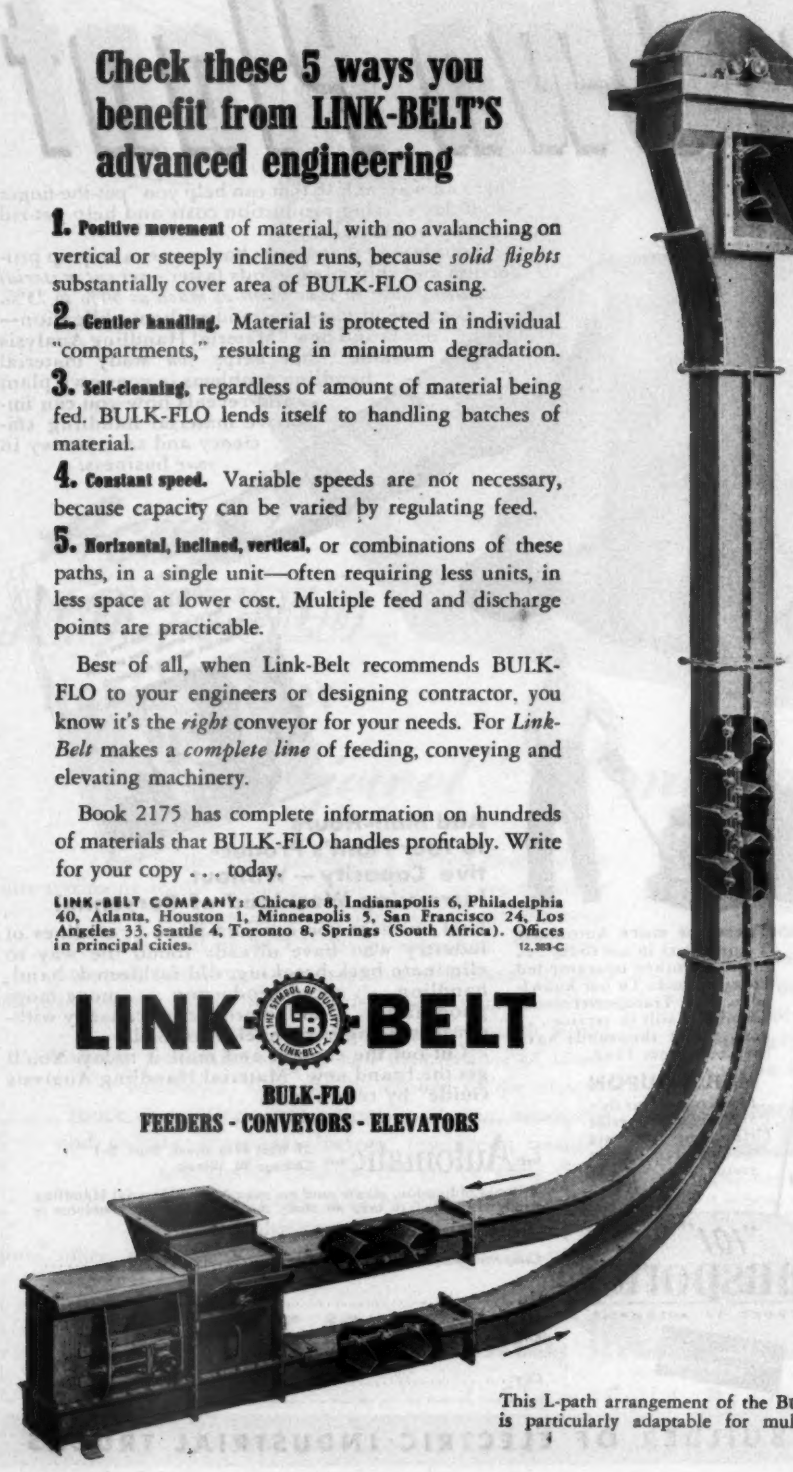
Best of all, when Link-Belt recommends BULK-FLO to your engineers or designing contractor, you know it's the *right* conveyor for your needs. For *Link-Belt* makes a *complete line* of feeding, conveying and elevating machinery.

Book 2175 has complete information on hundreds of materials that BULK-FLO handles profitably. Write for your copy . . . today.

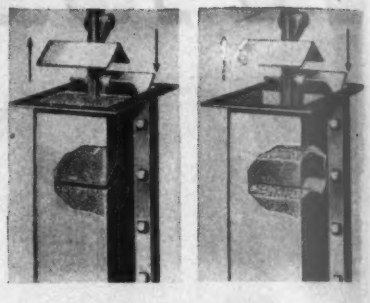
LINK-BELT COMPANY: Chicago 8, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities. 12,383-C

LINK-BELT

BULK-FLO
FEEDERS - CONVEYORS - ELEVATORS



This L-path arrangement of the BULK-FLO Conveyor is particularly adaptable for multiple feed points.



Full or partially loaded, Link-Belt BULK-FLO *with solid flights* provides positive, gentle material handling.

Bulk material handling is easier and safer with BULK-FLO

- Unit is self-clearing through intermediate runs.
- Minimum degradation of materials.
- Dust-Tight construction. Can also be made vapor-tight and liquid-tight.
- Handles batches on cycle operations.
- No contamination from lubrication.
- Chain and casings can be galvanized or made of alloy metals.

- Increased Production . . .
- Higher Employee Efficiency . . .
- Lower Manufacturing Costs . . .

with Pittsburgh COLOR DYNAMICS!

Works Manager of Aetna-Standard Engineering Company reports scientific use of energy in color is an excellent business investment that benefits workers and management alike.

PITTSBURGH can present no more convincing statement of the many benefits that result from the use of COLOR DYNAMICS—based upon the scientific principles of the *energy in color*—than this letter from R. D. Johnson, Works Manager of The Aetna-Standard Engineering Company of Youngstown, Ohio, consultants, designers and builders for steel and non-ferrous industries.

● **"We are pleased** to summarize what application of your system of COLOR DYNAMICS has done for our Ellwood City, Pennsylvania, plant.

● **"It was our custom** to paint our plant and equipment periodically, mainly for the purpose of protecting surfaces.

● **"Painting** can be a business investment, the same as machine tools and equipment. When a machine tool is purchased, the effect this tool will have on cost savings, production, employee efficiency, etc., are considered very carefully. Why not apply this rule to painting?

● **"With this** thought in mind, we asked color engineers of The Pittsburgh Plate Glass Company to visit our plant to explain the advantages of COLOR DYNAMICS.

● **"The survey was made** and the suggestions made by Pittsburgh color engineers were highly acceptable to our management.

● **"In a recent survey** we were pleased with the reactions and comments of our plant employees.

(a) General appearance was greatly improved.

(b) Better light reflection from ceiling and walls caused less eyestrain.

(c) Specially marked lines signified hazards and helped to reduce accidents.

(d) Housekeeping was simplified. Employees take pride in their work area and help to keep it clean.

(e) Improved morale helped to increase efficiency as well as to create better industrial relations.

● **"Considering** every factor, we believe that Pittsburgh COLOR DYNAMICS has contributed greatly to the success of our operations."

You Can Have A Color Engineering Study of Your Plant FREE on Request

● Why not investigate what Pittsburgh COLOR DYNAMICS will do for your plant? For a complete explanation of how this scientific painting system can be made to work for you, send for our free, profusely-illustrated booklet.

● Better still, let us make a detailed COLOR DYNAMICS study of your plant for you—*free* and without obligation. Call your nearest Pittsburgh Plate Glass Company branch and arrange to have one of our trained color engineers see you at your convenience. Or mail coupon.

SEND FOR A COPY OF THIS BOOK!

Pittsburgh Plate Glass Co., Paint Div., Department FM-121, Pittsburgh 22, Pa.

☐ Please send me a FREE copy of your Booklet *"Color Dynamics In Industry."*

☐ Please have your representative call for a Color Dynamics Survey of our properties without obligation on our part.

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PITTSBURGH PAINTS

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

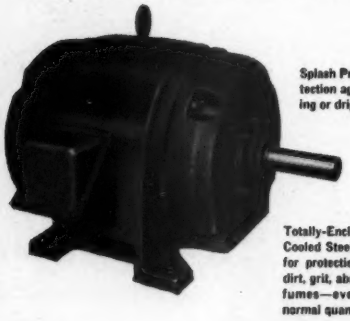
Wagner
ELECTRIC MOTORS
...the choice of leaders in industry

wherever motor hazards prevail...

GUARD PRODUCTION WITH Wagner Protected Motors

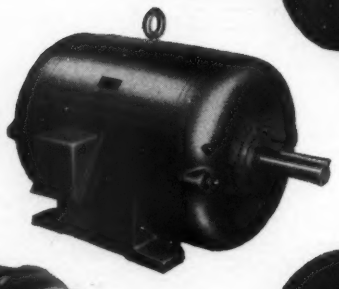
Do you use motors in locations where dirt, filings, moisture, splashing liquids, explosive gases, acid fumes, or other motor hazards prevail? If you do —no matter how severe the operating condition—Wagner can furnish the *right* motor for your purpose, adequately protected for specialized requirements.

Wagner protected type motors are known for completely dependable operation in their specific applications. They are backed by sixty years of motor building experience. Five protected-type Wagner Motors are shown below. Bulletin MU-185 gives full information . . . write for your copy.

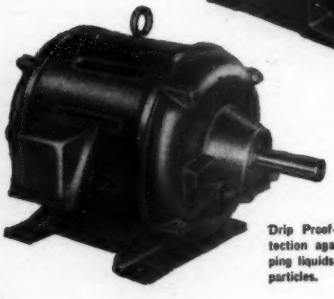


Splash Proof—for protection against splashing or dripping liquids.

Totally-Enclosed Fan-Cooled Steel Frame—for protection against dirt, grit, abrasives, or fumes—even in abnormal quantities.



Totally-Enclosed Fan-Cooled Cast Iron Frame—for protection against corrosion from fumes or moisture.



Drip Proof—for protection against dripping liquids or falling particles.

Explosion Proof—for complete protection in hazardous atmospheres.

WAGNER ELECTRIC CORPORATION
6412 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS · TRANSFORMERS · INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

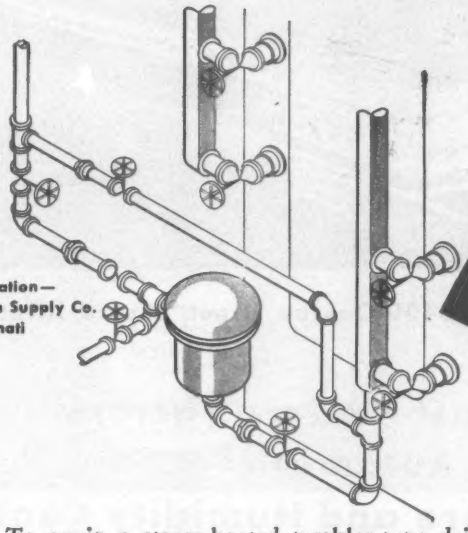
Wagner Electric Corporation
1891 1951

M51-10

for outstanding service

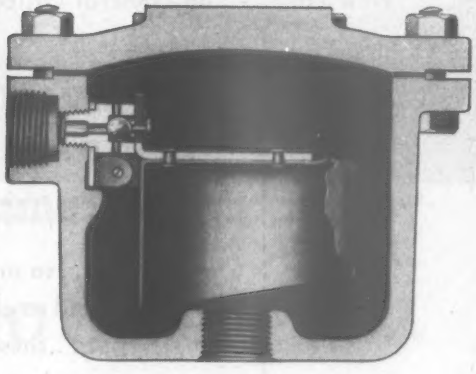
on Heavy-Duty Steam Drying Units

...for example



The installation—
American Linen Supply Co.
Cincinnati

Rely on Dependable CRANE STEAM TRAPS



Crane Inverted Open Float Steam Trap with patented ball-type disc, for 1 to 300 pounds saturated steam working pressures. Literature on request from your Crane Branch or Crane Wholesaler.

PROBLEM: To equip a steam-heated tumbler-type drier with a trap that would reduce start-up time to a minimum, and provide, automatically, a smooth, steady flow of hot, dry steam to the unit, with the lowest possible maintenance cost.

WORKING CONDITIONS: Steam pressure to drier, 125 pounds. Drier operated 16 hours daily on continuous batch basis.

SOLUTION TO PROBLEM: Crane No. 981, ¾-inch, 150-Pound Inverted Open Float Trap, carefully selected for adequate drainage capacity, and properly installed. (Now listed as No. 9810, with patented improved ball-type disc.)

RESULTS: Never requiring any repairs or new parts in more than 8 years' service, this Crane trap has given complete satisfaction. Periodic routine inspection only is total maintenance cost.

...ANOTHER TYPICAL CASE HISTORY demonstrating the better performance...& the lower ultimate cost of Crane Valves of all types ... and why—
More Crane Valves are used than any other make!

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THE POWERS REGULATOR COMPANY

New Factory and General Office Building: **3400 Oakton Street, Skokie, Illinois**

World's Most Modern Factory Producing Automatic Temperature and Humidity Control

. . . to meet the greatly increased demand for POWERS products and to give you better controls, better deliveries and better values . . . these advantages are possible with our large new plant and modern production facilities. With an enlarged engineering and production staff, plus 60 years experience in heating, ventilating, air conditioning and process control, we believe we can be of greater service than ever before to our many friends who have contributed to our success.

WILLIAM PENN POWERS
. . . with his invention of the first all pneumatic system of temperature control and gradual acting vapor disc thermostat made an invaluable contribution to the modern science of heating, air conditioning and industrial process control.

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(a55)

The "on-the-wall" test shows why famous Barreled Sunlight is America's outstanding paint value

You have to see it to believe it...

When you compare the price tag of a gallon of Barreled Sunlight with that of a gallon of any other good paint, there really isn't much difference. But, boy oh boy, when you put it on the wall, there is where you see the big advantage in value that you get with Barreled Sunlight.

For example, if you take a gallon of Barreled Sunlight and a gallon of any other good paint and thin each according to directions, you'll see that Barreled Sunlight gives you more paint ready for the brush. Which means, of course, you buy less paint.

But of greater importance, when you see how faster and easier a painter can cover a test area with Barreled Sunlight, you'll realize how much you can save in labor, which represents 80% of the cost of a painting job.

And finally, when you see how much better and brighter it looks after drying you'll be convinced that Barreled Sunlight will give you a better looking, longer lasting paint job for less money than any other paint.

Let our representative show you how an on-the-wall test can lead to important savings for you. Write and he'll call.

WE'LL BE AT THE PLANT MAINTENANCE SHOW PHILA. JAN. 14-17

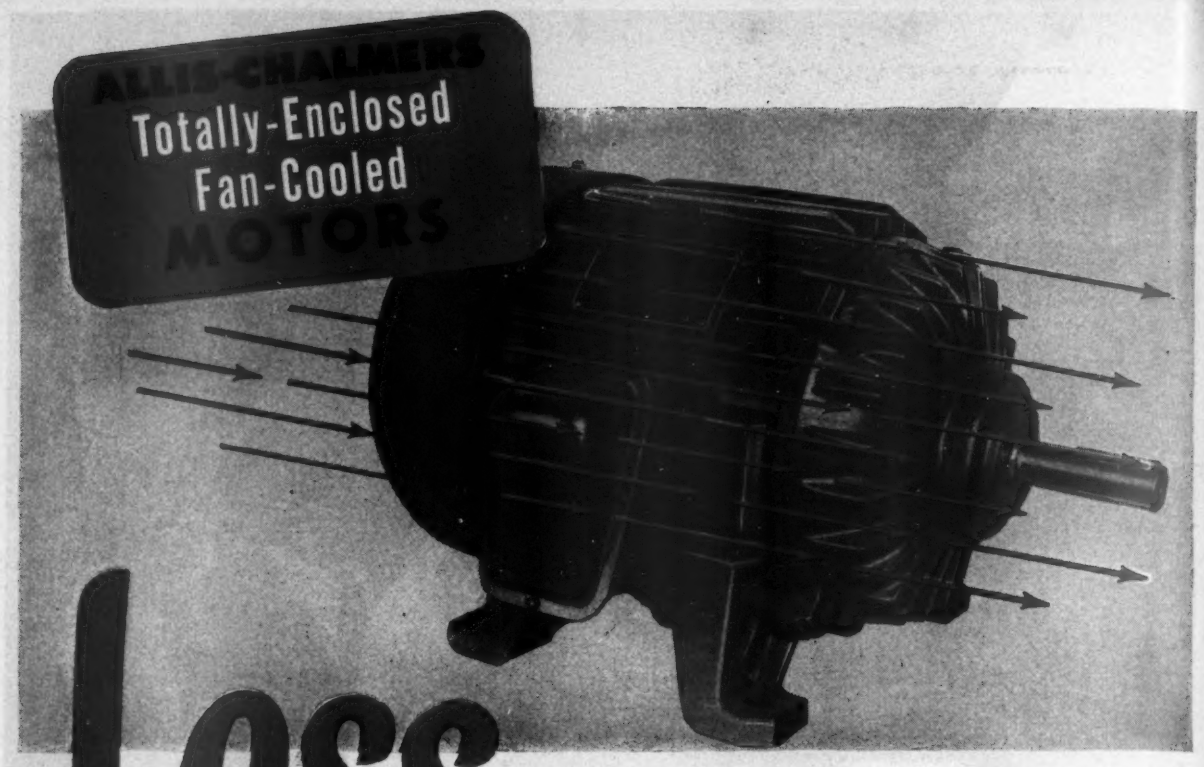
BARRELED SUNLIGHT PAINT COMPANY
2-L Dudley St., Providence, R. I.

Barreled Sunlight®

The Master Painter's Master Paint

In whitest white or clean, clear, wanted colors, there's a Barreled Sunlight Paint for every job

For over half a century the symbol of quality and dependability among paint buyers for leading industrial, institutional and commercial buildings



Less MOTOR CLEANING ...INSPECTION...OVERHAUL!

HERE'S A MOTOR that actually blows itself clean! Dirt is carried away by cooling air blown over the ribbed cast iron frame and bearing housings of this new Allis-Chalmers tefc motor.

Dirt can't build up to cause overheating. Concealed air passages and pockets have been eliminated. Even oily dirt that sticks can simply be wiped or blown off.

And this means savings! Maintenance costs are traditionally low on totally-enclosed, fan-cooled motors. But they're lower than ever before on the new Allis-Chalmers Type APZ tefc motor.

Rigid Construction

The frame is cast iron which has high resistance against corrosion and distortion. Bearings are pre-lubricated at the factory and should need no attention for years. Tapped holes with pipe plugs to permit regreasing and to provide grease relief are standard equipment.

Get All The Facts

The new Allis-Chalmers Type APZ totally-enclosed, fan-cooled motor is built in all NEMA standard frame sizes from 224* to 505. Also in explosion-proof type. Your A-C Authorized Distributor or District Office has complete information. Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7225.

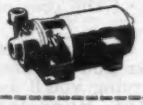
A-3426

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

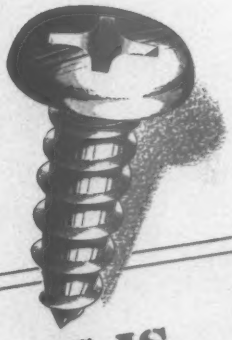


PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

Texrope and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS

*Similar design non-ventilated motors Type APK, also available in frames 203 to 224 inclusive.

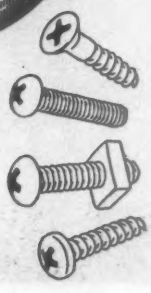


THIS IS AMERICAN

Type A TAPPING SCREW . . . for Speedier Fastening of Light-Gage Sheet Metal

This screw, hardened to a proper degree for toughness, forms its own thread in thin sheets (.015" to .050") of steel, brass, aluminum, and other metals. Its spaced thread of coarse pitch affords excellent holding power. Its sharp point makes for ease of starting in punched, drilled, or nested holes. In addition, the Type A Tapping Screw with PHILLIPS RECESSED HEAD starts faster because the driver is always automatically centered and aligned . . . Avoids assembly damage with driver and recess properly engaged . . . Improves the appearance of your product.

Another fastener of the American line, produced to high quality standards by skilled craftsmen using modern high production equipment.



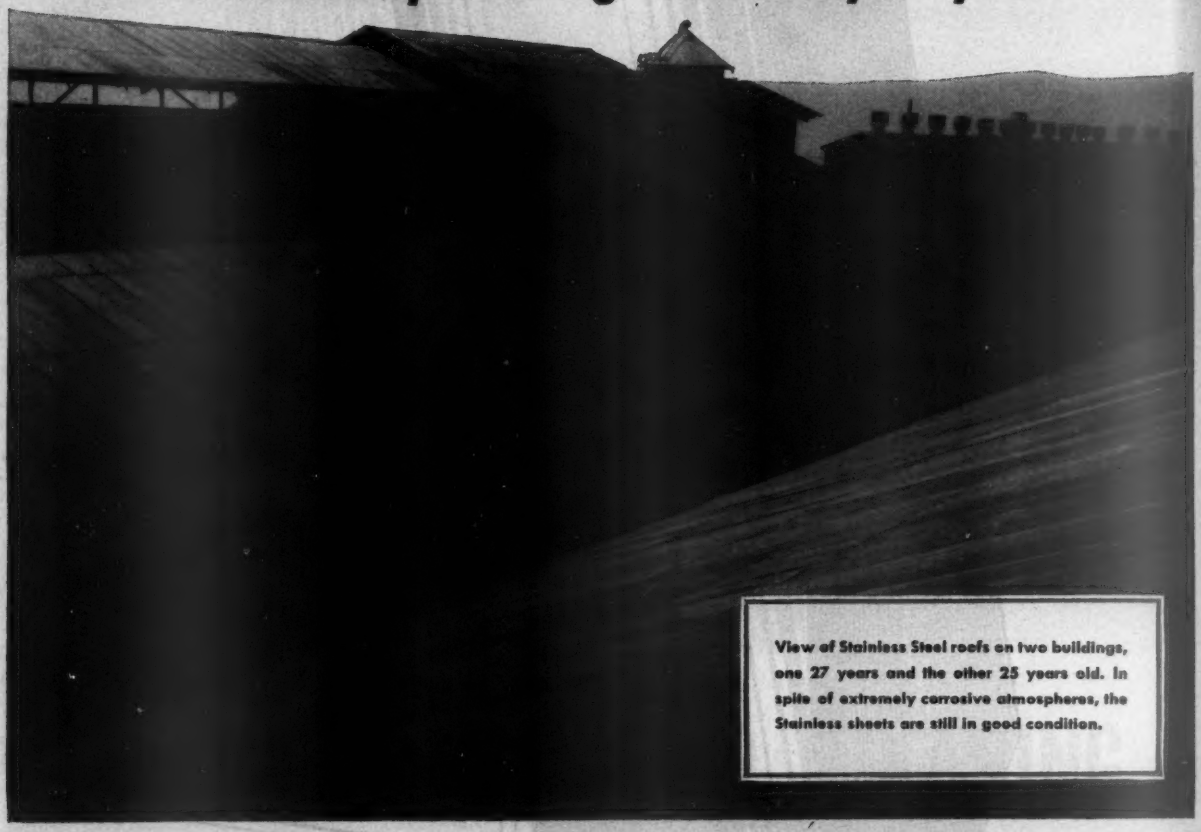
AMERICAN SCREW COMPANY

PHILLIPS HEADquarters

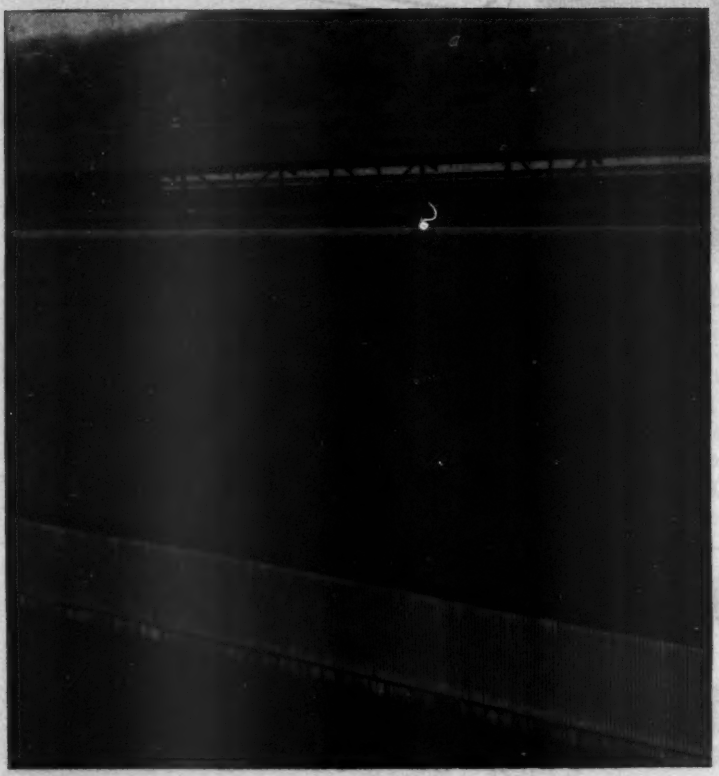
WILLIMANTIC, CONNECTICUT

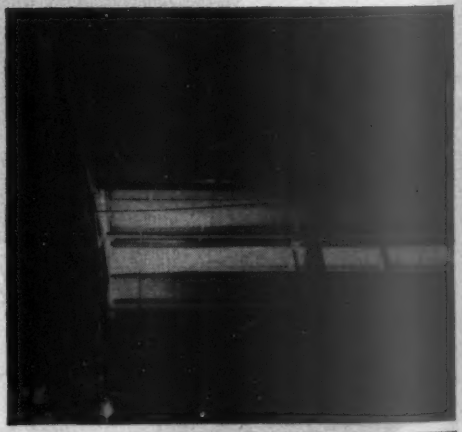
Main Office & Plant
Willimantic, Conn.
Office & Plant, Norristown, Pa.
Office & Warehouse, Chicago, Ill.

Ordinary roofing lasts only 2 years here



View of Stainless Steel roofs on two buildings, one 27 years and the other 25 years old. In spite of extremely corrosive atmospheres, the Stainless sheets are still in good condition.





Interior view of one of these buildings looking up at the Stainless roof.

This Stainless Steel roof is still structurally strong after a quarter century of service at the plant of a leading glass company. Stainless Steel is Type 410 (12% chromium).

but Stainless Steel

is still sound after 25 years

● Here's a striking example of the protection against corrosion you can obtain by using Stainless Steel walls and roofs.

A Stainless Steel roof was installed on two buildings at this glass smelting plant in 1924 and 1926. Recently a sheet located directly over a furnace discharging corrosive fumes was removed and examined. After 25 years, the Stainless Steel sheet was still in good condition . . . its strength was unimpaired. Its quarter-century of service is all the more outstanding when you consider that ordinary roofs last only two years in this highly-corrosive atmosphere.

Here is tangible proof of the long life and freedom from maintenance that Stainless Steel assures . . . that makes Stainless the most economical material you can use from a cost-per-year standpoint. And Stainless Steel's high strength weight ratio gives you additional savings from thinner gages and lighter supporting members.

You can get this material today!

Best of all, you can take advantage of this lower cost-per-year *now*. Two grades of U·S·S Stainless Steel—U·S·S 12 (Type 410) and U·S·S 17 (Type 430)—have given highly satisfactory service in industrial installations. In spite of the general shortage of Stainless Steel, both these grades are available today.

If you'd like additional information on U·S·S Stainless Steels for industrial walls and roofs, write for our free booklet. Send your request to United States Steel Corporation Subsidiaries, Room 4308, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

For additional information on U·S·S Stainless Steel for industrial walls and roofs, write for our new booklet. Use the handy coupon at the right.

United States Steel Corporation Subsidiaries
Room 4308, 525 William Penn Place
Pittsburgh 30, Pa.

☐ Please send me your booklet "U·S·S Stainless Steel for Walls and Roofs of Industrial Buildings."

☐ Please arrange to have your customers send me literature on their particular type of Stainless Steel roof and wall panels.

Name ..... Title .....

Address .....

City ..... State .....

**United States Steel is the producer of U·S·S Stainless Steel sheet and strip, not a maker of formed roof and wall panels. These are now being manufactured by a number of our customers.*

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · COLUMBIA STEEL COMPANY, SAN FRANCISCO
NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, FAIRFIELD, ALA. · UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

1-1908

UNITED STATES STEEL

Life-Linestarter
PAIRED FOR PRODUCTION
Life-Line motor
WESTINGHOUSE
WESTINGHOUSE
DO NOT LUBRICATE

Insure

machine performance with this matched pair

Motors and controls can make or break the performance of your machine tools. Why speculate? Life-Lines assure peak performance under all conditions. Take these, for example:

Accidental blows to starters? Will false operations result? Not with the Life-Linestarter®. Its inverted clapper-type design provides positive operation.

Contact life? Life-Linestarter contacts last longer, why? Because the exclusive "De-ion"® arc quickly divides, confines, and extinguishes the arc. Contacts, therefore never need filing.

Bearing lubrication? Life-Line motors pre lubricated, sealed-for-life bearings eliminate this problem. These bearings need no lubrication. And because they are sealed, there's less chance for grit and dust to harm the bearings.

Physical abuse? Falling objects, excessive vibration, corrosive atmospheres—all take a heavy toll of weak motor frames. Thousands of installations have proved that Life-Line's steel frame stands up to physical and chemical abuse better than conventional frames. Steel adds strength without additional weight.

Consider the many other features of this motor and control production team—"paired for performance." Your Westinghouse representative has the facts. Ask him for copies of "Life-Line Motor Book" B-3842 and "Tomorrow's Starter Today" B-4677. Or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-21638

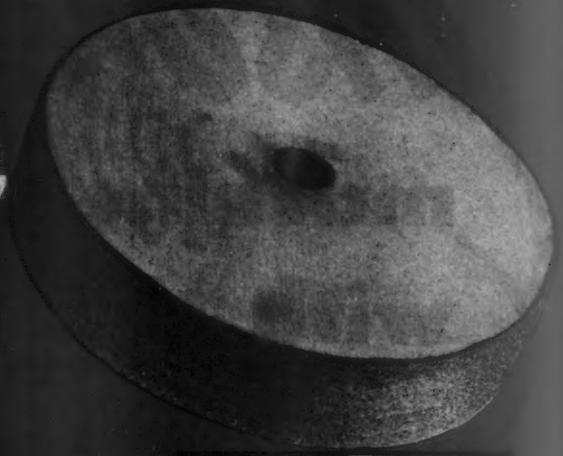
YOU CAN BE SURE... IF IT'S Westinghouse

Life-Line

MOTORS and CONTROLS

You can put the RIGHT

For best results... the RIGHT Abrasive, correctly applied...

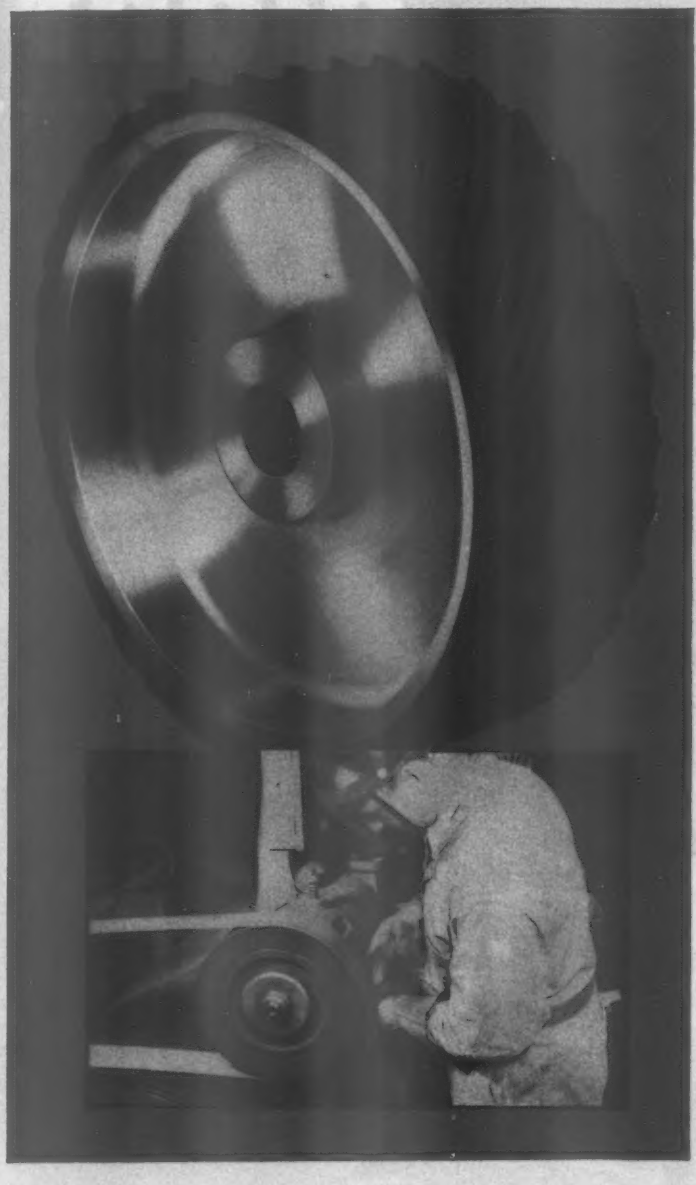


Abrasives by CARBORUNDUM are designed and made to perform efficiently. Their selection and application are based on the impartial recommendation of a trained and experienced CARBORUNDUM salesman or distributor. You can be sure they will do your job right.

Only **CARBO** TRADE

"Carborundum" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company, Niagara Falls, New York

abrasive on every job!



Unless you *know* you're using the *right* abrasive products you're losing time and money that could probably be saved simply by calling in CARBORUNDUM. Our representatives can point out improvements and savings based upon a combination of advantages which only CARBORUNDUM can provide:

A complete line of abrasive products from which you can select the bonded, coated or grain product best suited to any specific job.

Impartial recommendation of abrasive products and methods by an experienced CARBORUNDUM salesman or distributor as a guide to proper selection.

Up-to-date information on improvements and developments throughout the entire range of abrasive applications.

Experienced technical counsel. Your CARBORUNDUM representative is a trained specialist. He can determine the relative importance of such factors as rate of feed, stock removal, machine speed, dressing, coolants, and other variables affecting abrasive choice. Also, he has access to 60 years of engineering experience at The Carborundum Company —experience gained in solving thousands of tough abrasive applications.

Top performance from products of uniformly fine quality by CARBORUNDUM . . . the best-known name in abrasives.

Next time, consult your CARBORUNDUM salesman or distributor or write Dept. FM 80-34.

RUNDUM

MARK

makes ALL Abrasive Products . . . to give you the proper ONE

80-34

giant

Versatility of this new LeBlond 16"/38" Sliding Bed Gap Lathe is demonstrated at Mixing Equipment Co., Inc., Rochester, New York. The irregularly shaped semi-steel base (below) swings 33", overhangs 18". depth of cut (intermittent) 3/4", spindle speed, 86 rpm, feed, .014", tool: carbide. The 14" AISI 304 stainless steel shaft and coupling (above) are accommodated without special equipment by extending the bed; the coupling is turned to limits of .001" depth of cut 1/16", spindle speeds, 166 rpm roughing, 212 rpm finishing, feed .010", tool: carbide.

"eggbeaters" . . . . . for industry

These huge mixers (up to 500 hp) do a big job of "eggbeating" for industry. They're used to blend chemical formulations—to mix pulp for paper—to combine ingredients for thousands of everyday products.

In producing these mixers, Mixing Equipment Co., Inc. of Rochester, New York, has to turn a variety of work . . . from short parts with irregular swings up to 33″, to shafts as long as 14′—materials from brass to stainless steel—intermittent cuts to heavy roughing cuts to smooth finishing cuts—tolerances down to .001″. All this calls for a rugged precision lathe of unusual versatility. That's why Mixing Equipment Co., Inc. installed a new LeBlond 16″/38″ Heavy Duty Sliding Bed Gap Lathe, recommended by LeBlond Distributor, F. W. Schiefer Machinery Company of Rochester.

This multi-purpose LeBlond Sliding Bed Gap Lathe is a sweetheart in the shop. It has adjustable gap and center distance, and with bed closed, it operates the same as a standard heavy duty engine lathe. Twenty-four or forty-eight spindle speeds are available, 11 to 673 rpm or 8 to 1010 rpm, respectively—sixty feeds and threads—up to 15 hp. And of course you get all the well-known LeBlond features—hardened and ground steel bed ways, totally-enclosed quick-change box, automatic lubrication, one-piece apron, thrust-lock tailstock and many more.

Whether your turning jobs call for versatility or production, heavy hogging or fine finishing, there's a LeBlond Lathe to turn them faster, better. Your LeBlond Distributor will tell you about the three Sliding Bed Gap Lathes, 16″/38″, 25″/50″ and 32″/60″. Call him or write—

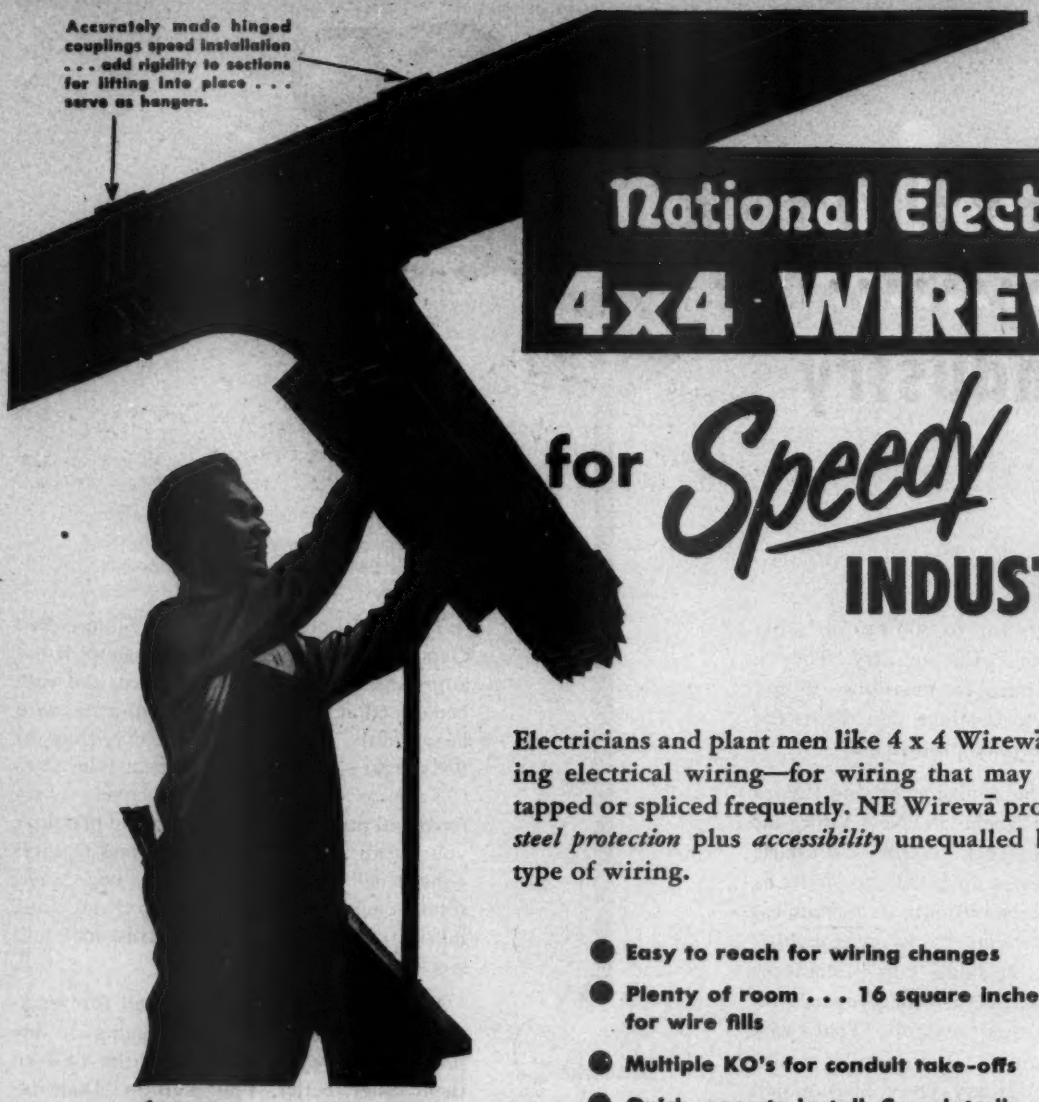
THE R. K. LEBLOND MACHINE TOOL CO., CINCINNATI 8, OHIO

Ask for Bulletin SBG 103 H for comlete information on LeBlond Heavy Duty Sliding Bed Gap Lathes.

turned faster by

LeBLOND of Cincinnati

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 64 YEARS


Accurately made hinged couplings speed installation . . . add rigidity to sections for lifting into place . . . serve as hangers.

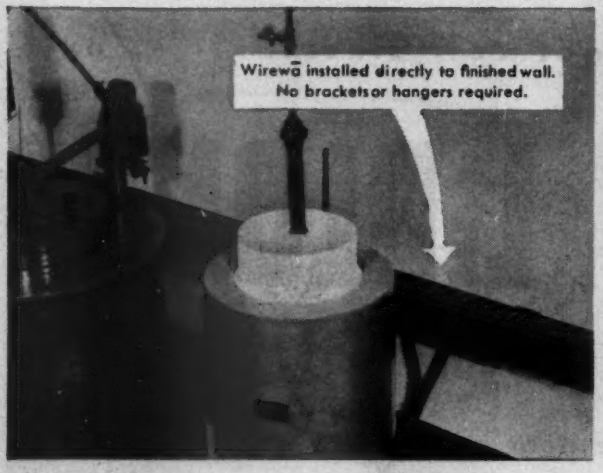
National Electric 4x4 WIREWĀ

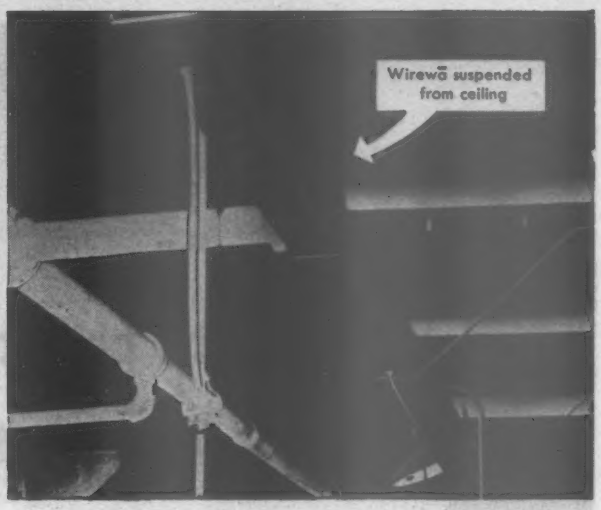
for *Speedy* INDUSTRIAL

Electricians and plant men like 4 x 4 Wirewā for protecting electrical wiring—for wiring that may be changed, tapped or spliced frequently. NE Wirewā provides *rugged steel protection* plus *accessibility* unequalled by any other type of wiring.

- **Easy to reach for wiring changes**
- **Plenty of room . . . 16 square inches of wireway for wire fills**
- **Multiple KO's for conduit take-offs**
- **Quick, easy to install. Complete line of fittings**
- **Low maintenance**
- **Easy to reroute and extend . . . 100% salvable**

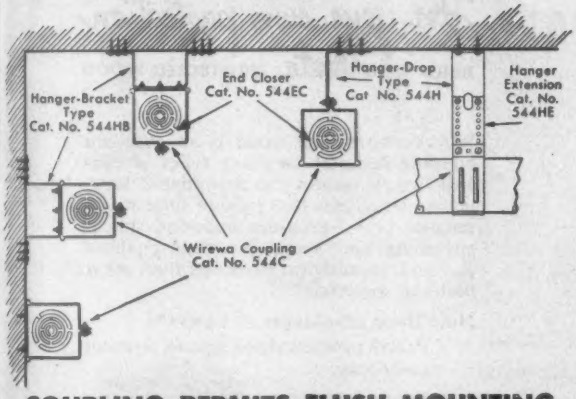
A Wirewā you'll like!





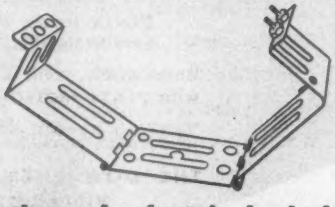
WIRING, EXTENSIONS and RELOCATIONS

Methods of Hanging 4x4 Wirewā


Hanger-Bracket Type Cat. No. 544HB
End Closer Cat. No. 544EC
Hanger-Drop Type Cat. No. 544H
Hanger Extension Cat. No. 544HE
Wirewa Coupling Cat. No. 544C

COUPLING PERMITS FLUSH MOUNTING

Hinged coupling speeds installation. Simply place around sections to be joined. Tighten two bolts. Three sides flat.



4x4 WIREWĀ FILL TABLE ALL ONE SIZE WIRE

Wire Size	Area of Rubber Covered Wire—Square Inches		Maximum Number of Wires—All of One Size	
	Types R, and RH	Types T, and TW	Types R, and RH	Types T, and TW
14	.023	.013	139*	246*
12	.027	.017	118*	188*
10	.046	.022	69*	145*
8	.076	.040	42*	80*
6	.123	.081	26	39*
4	.16	.108	20	29
2	.21	.147	15	21
1	.27	.202	11	15
1/0	.31	.236	10	13
2/0	.35	.278	9	11
3/0	.41	.328	7	9
4/0	.48	.390	6	8
250M	.59		5	
300M	.68		4	
400M	.83		3	
500M	.98		3	

No. 14 to 8, solid wire; No. 6 and larger, stranded.
*Maximum number of conductors limited to 30, except as noted in N.E. Code.

Listed by Underwriters' Laboratories, Inc.

Sold through electrical wholesalers everywhere.

EVERYTHING IN WIRING POINTS TO

National Electric
PRODUCTS CORPORATION

1347 CHAMBER OF COMMERCE BLDG. • PITTSBURGH 19, PA.

Wood that's protected makes new buildings cheaper to construct...

easier to maintain!

For your own protection

BUILD WITH PENTA-PROTECTED WOOD

PENTA-PROTECTED wood is an excellent building material for many types of construction. It assures you dependable, long-lasting structures that require little maintenance . . . provides superior flooring, sheathing and sound-proofing qualities . . . and, in addition costs far less than other building materials!

Note these advantages of PENTA*:

1. PENTA protects wood against termites and decay.
2. PENTA-PROTECTED wood lasts up to *four times longer.*
3. PENTA leaves the wood clean and easy to handle.

Build wisely, well, and economically with PENTA-PROTECTED WOOD!

*PENTA is a popular abbreviation of the name of the chemical, pentachlorophenol.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

Send for free booklet
"Pointers on Penta"

The Dow Chemical Company
Dept. PE-29C
Midland, Michigan

Name_____

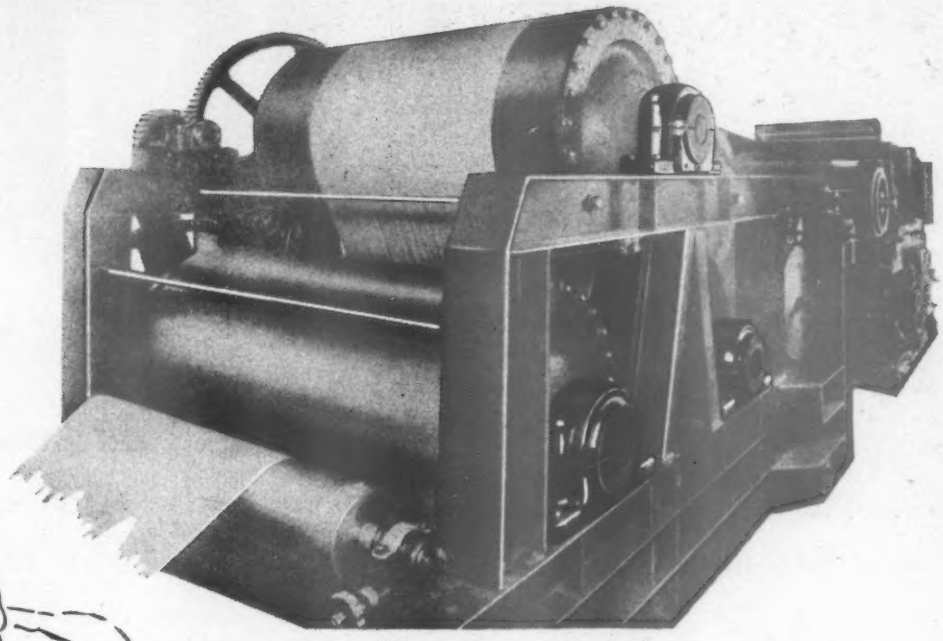
Title_____

Company_____

Address_____

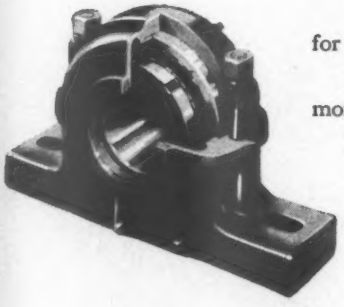
City_____ State_____

DOW
Penta
chlorophenol



PLASTIC SURGERY *for specialty "wrappings"*

change-over by SKF Distributor —production increased in The Albemarle Paper Manufacturing Company plant



Here's an asphalt laminating machine that really "performs the wonders of modern surgery" to kraft and asphalt. But, this manufacturer of waterproof, asphalt-laminated and reinforced paper for specialty wrappings required a tremendous increase of machine speed. The SKF Distributor, the industrial division of Richmond Auto Parts, Inc., Richmond, Va., were called-in to solve the problem. A change-over to SKF Pillow Blocks; a change in the drive design and increased speed was both possible and practical. On change-overs on any anti-friction problem—in all plants—your nearby authorized SKF Distributor is the man to phone. 7251-A

8 REASONS WHY SKF IS PREFERRED BY ALL INDUSTRY

integrity
craftsmanship
metallurgy
tolerance control
surface finish
product uniformity
engineering service
field service

SKF
BALL AND ROLLER BEARINGS

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.
—manufacturers of SKF *and* HESS-BRIGHT *bearings.*

BUY NOW.

MANUAL MOTOR CONTROLS

Remove power installation bottlenecks . . .
Act now for delivery of Westinghouse manual starters

Here's how to lick a double-edged threat to tight production schedules and critical maintenance problems.

First, get your manual motor controls — now! Westinghouse offers you prompt handling of orders, speedy action on delivery of across-the-line small motor controls for usual applications and for special operating conditions. In addition, Westinghouse engineers can help you apply available motor and control equipment to the best possible advantage.

Second, get the control that is built to beat the heat of today's pace—the control of proved reliability that only top design engineering and superior productive facility can give you.

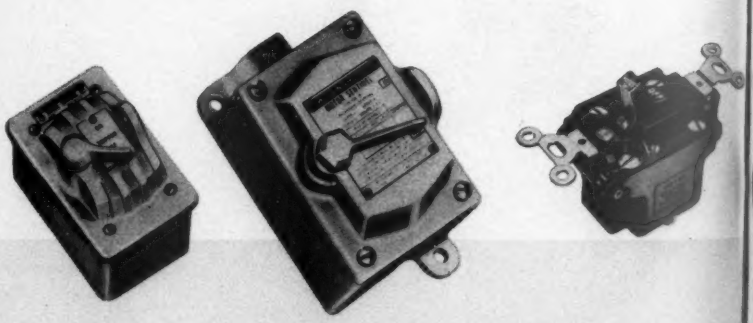
Buy from the greatest selection of motor control in industry today. Call or wire your Westinghouse Distributor.

Across-the-line manual motor sentinel* for small motors

1. For a-c or d-c single-phase small motors, 1 hp and below, single or double-pole types.
2. Positive, time-delay bimetallic action . . . assures reliable motor overload protection.
3. Safe . . . completely enclosed, no live operating parts exposed; trip-free switch can't be held closed against overload; foolproof calibration.
4. Trouble-free . . . over-center toggle mechanism; quick-make, quick-break.
5. Durable, lightweight enclosure . . . die cast of aluminum; Bonderized for long life; dust resistant.
6. Meets all requirements of National Electric Code.
7. Heater front removable—not necessary to disassemble or remove from enclosure.

*T. M.

Manual Motor Sentinel with Standard Surface Enclosure.



ENCLOSURES FOR EVERY REQUIREMENT

Cast-iron dust-tight, water-tight enclosure; compact, smallest in industry; NEMA III, IV and V.

Cast-iron explosion-proof enclosure; NEMA VII Class I, Group D; NEMA IX Class II, Groups E, F and G.

Switch Unit Alone—Operating mechanism completely enclosed in sturdy bakelite housing; fits any standard 2½" deep wall box for flush applications.

NEMA I-A semi-dust-tight manual motor starter
Special gasketing exclusive in the industry

The Westinghouse Semi-Dust-Tight Manual Starter is ideal for dusty or oil-laden atmospheres where more expensive explosion-proof types of starters are not required by Code. Neoprene rubber gasket insures a tight fitting cover. Another new feature is the attractive rotary operating handle. All other proved features are identical with the outstanding Westinghouse Motor Watchman®, Type DNW, Class 10-100. Applications include woodworking machinery, grain mills and machine tools, and locations where oil, dust and cutting coolants are used.

The enclosure is Bonderized for positive rust-resistance; adds years to starter life.

Available now in Class 10-100 VOA, Size O, and Class 10-100 VI, Size 1. J-30081

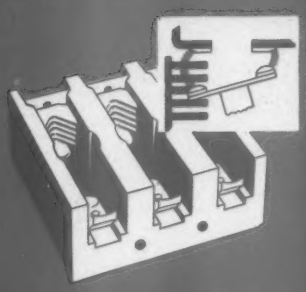
NEMA I-A Manual Motor Starter

FM

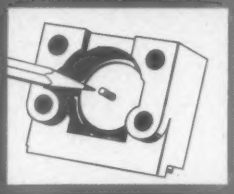
The Only Starter Meeting All Requirements of the Associated Factory Mutual Fire Insurance Companies.

SUPERIOR DESIGN

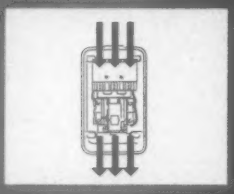
Continuous Neoprene Gasket Pressure Sealed On; Keeps Dust Out; Lift-Off Cover Provides Quick Inspection and Servicing of Starter.



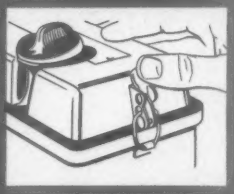
1. "De-ion"® Arc Quenchers Reduce Arcing Time, Extinguish Dangerous Arcs in Half-Cycle.



2. Positive Bimetallic Snap-Action Disc Overload Protection.

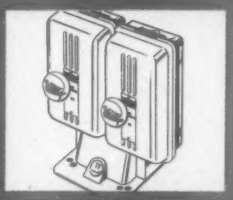


3. Straight Through Wiring Speeds Installation, Maintenance.

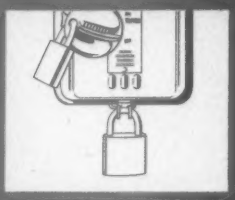


4. Pressure-Type Cover Clamp—Tight Seal Is Maintained.

5. Rotary Handle Prevents Accidental Operation; Trip-Proof.



6. Single or Double-Mounting Pedestals for Floor Applications.



7. Handle and Cover Locks to Eliminate Tampering.

YOU CAN BE SURE... IF IT'S

Westinghouse

CONTROL

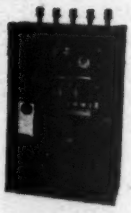
Which do YOU need to protect YOUR business from FIRE?

Kidde Multi-Jet Nozzle. The "business end" of a Kidde CO_2 fire extinguishing system. It blankets flame with fire-smothering carbon dioxide.

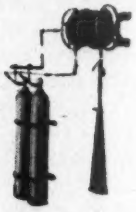
Kidde Dry Chemical Wheeled Extinguisher. A "one man fire engine" to control large fires in flammable liquids, live electrical equipment.

Kidde "Heat Detector". 24 hours a day this sensitive detector stands guard ready to set off a Kidde CO_2 system automatically if fire should strike.

Kidde Carbon Dioxide Portable. Fast-acting...easy to use. A pull of the trigger releases a rolling fog of CO_2 gas that smothers flame instantly.



Kidde Smoke Detector. A new development in industrial fire fighting. Detects hidden smoldering fire, tells in which room or vault it is located.



Kidde CO_2 Hose Reel Equipment. Combines the convenience of a portable fire extinguisher with the great fire-killing power of a built-in system.

Kidde Trailer. An economical, fast-acting unit for thorough-going fire protection in smaller plants and airports and auxiliary protection in larger ones.

Kidde Chemical Extinguishers. Foam, Soda-acid or water portable extinguishers in stainless steel. Two-and-a-half gallon capacity. Easy to use, reliable, economical.

Kidde Vaporizing Liquid Extinguisher. Approved for fires in flammable liquids and electrical equipment. Discharges carbon tetrachloride.

For many years Walter Kidde & Company, Inc. has specialized in fire extinguishing equipment. It ranges from 2½ pound portables to huge built-in systems. Need advice on protection for your plant? Call or write Kidde.

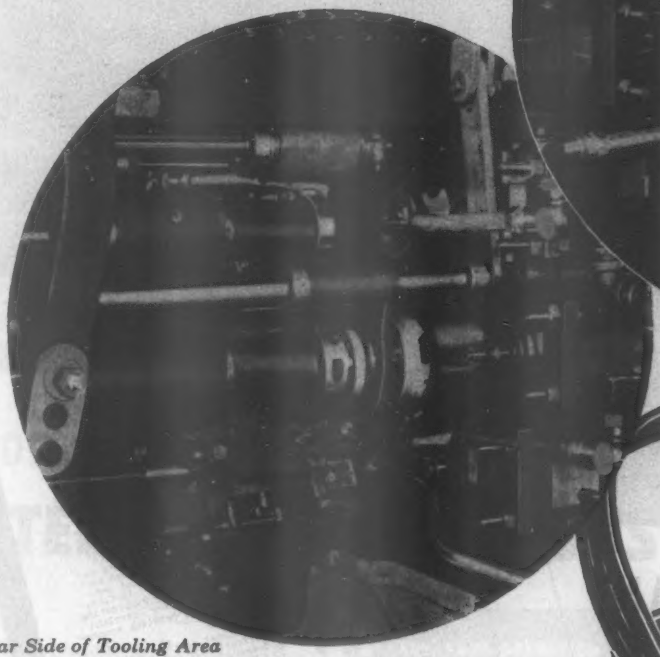
Kidde

Walter Kidde & Company, Inc., 1232 Main Street, Belleville 9, N. J.

Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.

MORE IN ONE BASKET

Front Side of Tooling Area



Rear Side of Tooling Area

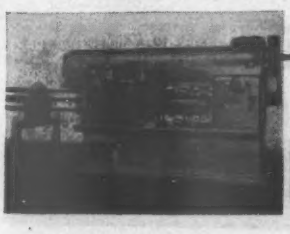
The "automatic" has substantiated many of the advantages of centralized responsibility in metal turning.

Even the earlier users realized that more work pieces can be profitably placed in one basket *if nothing upsets the basket.* Dependable performance has always been vital to the successful use of the "automatic".

The factors that determine the degree of dependability of an "automatic" are a very important part of its specifications. They are a part of the *complete* information available on CONOMATICS.

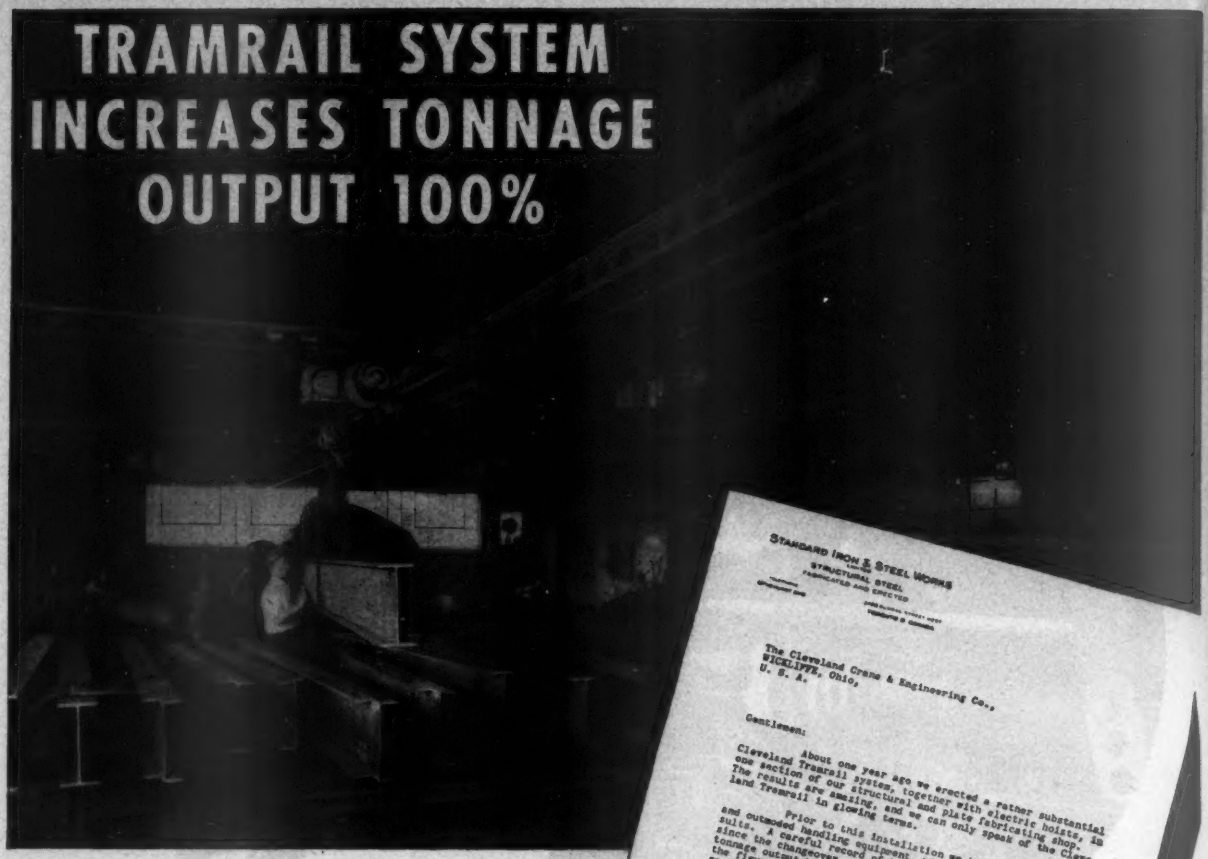
In producing the above part on a 1⅝"-SIX, the cycle time of 14 seconds per piece is not as important as the total time necessary for the entire run. Dependable performance pays.

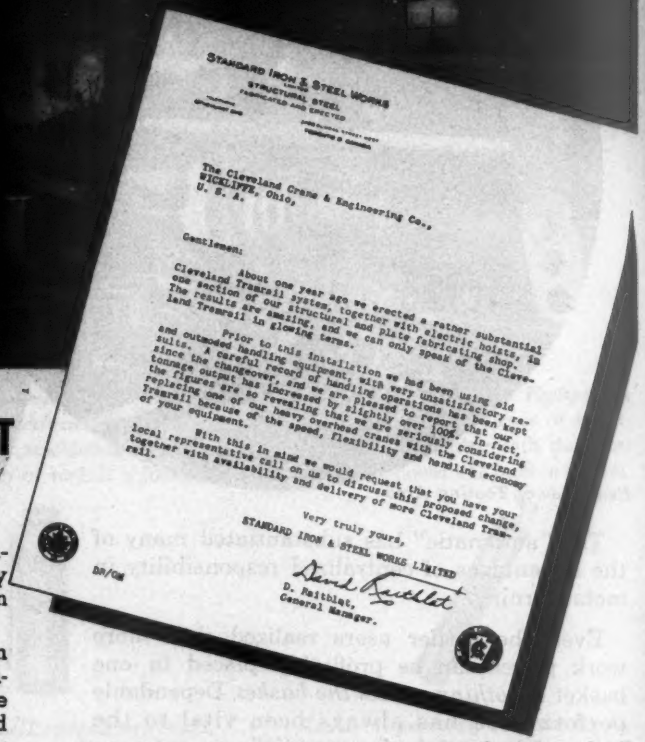
A Comparison of ALL Automatics is in Favor of Cone



Conomatic CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.

TRAMRAIL SYSTEM INCREASES TONNAGE OUTPUT 100%





STANDARD IRON & STEEL WORKS
STRUCTURAL STEEL
FABRICATED AND ERECTED

The Cleveland Crane & Engineering Co.,
WICKLIFFE, Ohio,
U. S. A.

Gentlemen:

About one year ago we erected a rather substantial one section of our structural and plate fabricating shop. Cleveland Tramrail system, together with electric hoists, in The results are amazing, and we can only speak of the Cleveland Tramrail in glowing terms.

Prior to this installation we had been using old and outmoded handling equipment, with very unsatisfactory results. A careful record of handling operations has been kept since the changeover, and we are pleased to report that our tonnage output has increased by slightly over 100%, that our figures are so revealing that we are seriously considering replacing one of our heavy overhead cranes with the Cleveland Tramrail because of the speed, flexibility and handling economy of your equipment.

With this in mind we would request that you have your local representative call on us to discuss this proposed change, together with availability and delivery of more Cleveland Tramrail.

Very truly yours,
STANDARD IRON & STEEL WORKS LIMITED
D. Raithat,
General Manager.

DR/CS

STEEL FABRICATING PLANT AMAZED AT RESULTS

The tremendous way in which a Cleveland Tramrail system can cut costs has been convincingly proven to Standard Iron & Steel Works, a well known steel fabricator in Toronto, Ontario.

They replaced a standard I-beam crane system in a section of their plant with modern Cleveland Tramrail equipment. The easy, smooth operation of the new system and efficiency it introduced, enabled them to double their previous tonnage output. Their production costs were cut so drastically that the entire changeover in handling equipment was quickly written off.

The story of Standard Iron & Steel Works is typical of hundreds that could be told for industries of all kinds. Regardless of size or type, most Cleveland Tramrail installations pay for themselves in a few months—and they keep on paying handsome dividends year after year thereafter.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3250 EAST 284th ST., WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

High Production Shearing is done at The S. K. Wellman Co., Cleveland, with this No. 110 Steelweld Shear.

For High Production Shearing STEELWELDS are "TOPS"

"What makes Steelweld Shears tops?", you ask. "Why are they so outstanding for high production shearing?" Here are some reasons:

1 EASY, FAST OPERATION Electric foot control, standard on Steelwelds, enables shearing speeds not attainable with ordinary mechanical foot treadles. Easily operated by a mere touch of the toe, it can be moved on floor to wherever most convenient.

2 SMOOTH, CLEAN CUTS Unusually smooth, clean cuts are obtained because of Steelweld's exclusive pivoted-blade cutting action. The upper knife travels in a circular path and pulls away from lower knife immediately after shearing. This prevents binding of cut pieces between back gauge and knife. Knife wear is reduced.

3 QUICK, SIMPLE KNIFE ADJUSTMENT Best possible cut for any thickness plate can be made, because of Steelweld's exclusive Micro-Set knife clearance adjustment which can be made in a few seconds.

4 CONVENIENT, ACCURATE BACK GAUGE Before the gauge at rear of an ordinary shear can be reached, a Steelweld back gauge is usually set and the machine in operation, because the adjustment is on the outside of frame near front where conveniently reached. Ball bearing equipped, it is easily operated and accurate.

5 MAXIMUM PRODUCTION Steelweld Shears are built for heavy-duty high production work. The one-piece welded steel frame and all operating details are liberally designed to provide extra stamina. Servicing is simple. All parts are easily accessible. As a result, downtime is minimum and production maximum.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

3231 EAST 282nd STREET WICKLIFFE, OHIO

STEELWELD PIVOTED BLADE SHEARS

MOTOR STARTERS

Manual Magnetic Combination

ACROSS-THE-LINE STARTERS are easy to install and wire—compact enough to be installed on or near the controlled machine. Manual Starters in sizes 0 and 1, Magnetic in sizes 0-7 for motors from fractional to 600 hp, Combination in sizes 0-5. General Purpose and special enclosures to fit every need.

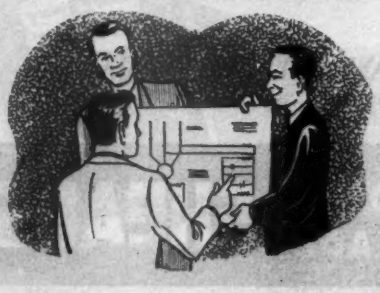
Manual Magnetic

REDUCED-VOLTAGE STARTERS are used where the power system has insufficient capacity for full-voltage starting . . . to safeguard machinery or processes from high starting torque or current inrush. Choose from autotransformer, reactor and resistor types. Wide line available.

STARTERS for E

Choose From This Wide Selection of Generously Designed Starters . . . Backed by Broad Application Experience in Every Industry

WHATEVER YOUR CONTROL NEED — starting, smooth acceleration, speed control, stopping, reversing, dynamic braking — there is an Allis-Chalmers starter to do the job. All are easy to install and have construction features that assure long life, dependable operation, simplified inspection.



Low-Voltage Starters, Sizes 0-3 for example, have silver-to-silver double break contacts that never require dressing. A screwdriver is the only tool you need for inspection of magnet coils, heaters, contacts — all replaceable parts.

Sizes 4-7 have time-proven clapper-type contacts with rolling-wiping action to keep current carrying areas clean, free of pitting and arcing. Current is interrupted quickly and arcing minimized by chutes of new design. All electrical and mechanical parts are easily accessible.

High-Voltage Starters give you everything needed for complete motor control and protection in a single enclosure. Contactors, meters, overload relays, auxiliary switches — all needed parts are selected to meet the requirements of your application. Enclosures are compartmented to isolate high-voltage devices. If you need the short circuit protection of current limiting fuses, specify Type H high-voltage starters.

Remember, A-C application engineers have wide experience serving all industry. Their experience, plus this broad line of starters, is your assurance of the right starter for your job. Call your nearby A-C representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

2300-5000 Volt

MOTOR STARTERS

Squirrel-Cage

THE TYPE 371 Wall-Mounted Starter for 2300-volt motors is completely sealed . . . protects the completely oil-immersed mechanism from weather, corrosion and dust. Wall mounting saves space.

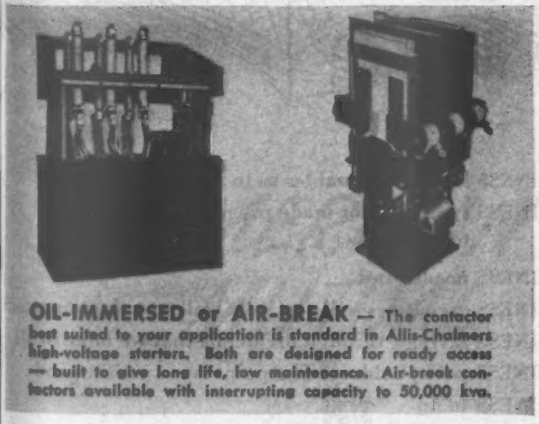
Synchronous

ALLIS-CHALMERS Synchronous Motor Starters apply field excitation automatically when proper speed is reached . . . even select the exact half cycle for smoothest field application.

Wound-Rotor

WOUND-ROTOR Motor Control for either starting or speed control duty, is built with the number of accelerating points your application requires. High-Voltage Starters are built for motors to 2500 hp.

Every Motor Need!



OIL-IMMERSED or AIR-BREAK — The contactor best suited to your application is standard in Allis-Chalmers high-voltage starters. Both are designed for ready access — built to give long life, low maintenance. Air-break contactors available with interrupting capacity to 50,000 kva.

Allis-Chalmers, Milwaukee 1, Wisconsin

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Send me the bulletins indicated below:

- ☐ High-Voltage Starters - - - - - - 1486410
- ☐ Type 371 Wall-Mounted Starter - - - 1487274
- ☐ Type 256 Air Contactor - - - - - 1487303
- ☐ Low-Voltage Across-the-Line Starters - - 1487132
- ☐ Low-Voltage Reduced-Voltage Starter - - 1487215
- ☐ Control Devices - - - - - - - - 2587095

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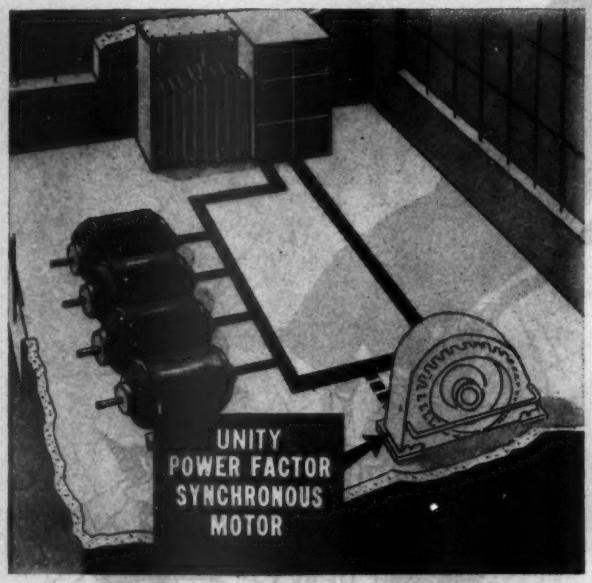
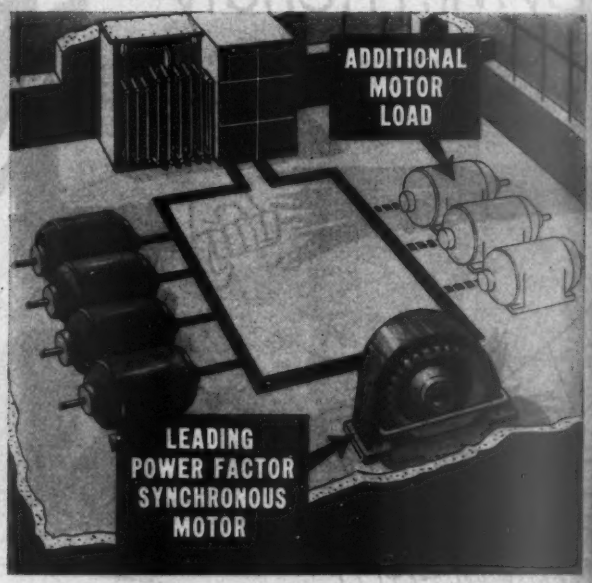
How to get more out of

. . . . *install G-E Synchronous Motors* for





If your plant power system is loaded close to full capacity and you have a place where a large constant-speed motor can be used, you may be able to install a *unity power-factor* synchronous motor without increasing the kva load on your system.

Or, if your power system is already overloaded, then a *leading power-factor* synchronous motor can actually supply kvars to your system while performing its usual drive duties. Then you can often install additional inductive apparatus to an existing system without fear of overloading feeder lines.

If you are planning plant expansion or you need more motors and/or suspect power system overloading, contact the nearest G-E sales engineer. He'll help you survey your system, and help you determine the type of synchronous motor you need—should this be one answer to your power system problems. *General Electric Company, Schenectady, N.Y.*

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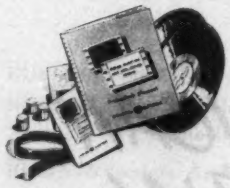
Everyone concerned with technical training problems will want this new G-E Motor Selection and Application Course. Consists of 9 short, easily understood lessons. Complete kit—slide films, review booklets and instructor's manual—$100. Call or write your nearest G-E sales office, or send for free copy of 96-page instructor's manual.

Look at the scope of this Course



1. Fundamentals of Motors
2. Types of Motors
3. Fundamentals of Selection
4. A-c Induction Motors
5. Single-phase Motors
6. D-c Motors
7. Synchronous Motors
8. Adjustable-speed Drives
9. Gear Motors

GENERAL ELECTRIC

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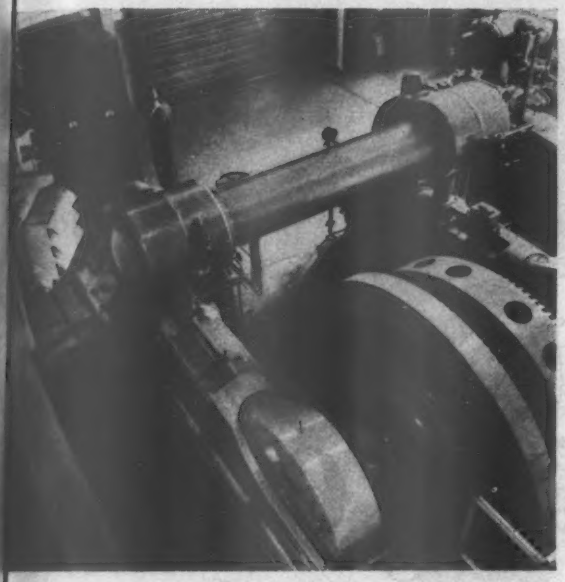

ontrol, too, will protect your system—G-E Limitamp igh-voltage control provides ample interrupting ca- acity, protection for operating personnel, good appear- nce, and compactness. Here it controls and protects a 50-hp G-E synchronous motor.

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( ) GEA-5332—Low-speed Synchronous Motors
( ) GEA-5426—High-speed Synchronous Motors.
( ) GEA-5469—G-E Testing Instruments
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The packing nuts of this condenser are being run to uniform tightness because of the power regulator of the CP-3440 REVERSIBLE AIR IMPACT WRENCH. This control of tightness also adapts the CP-3440 for assembly line work anywhere.

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The complete line of CP AIR IMPACT WRENCHES meets every demand for tightening or removing nuts and bolts, driving and removing wood and lag screws, driving and removing studs, and for tapping, in all kinds of maintenance work. *Write for Bulletin 812.*

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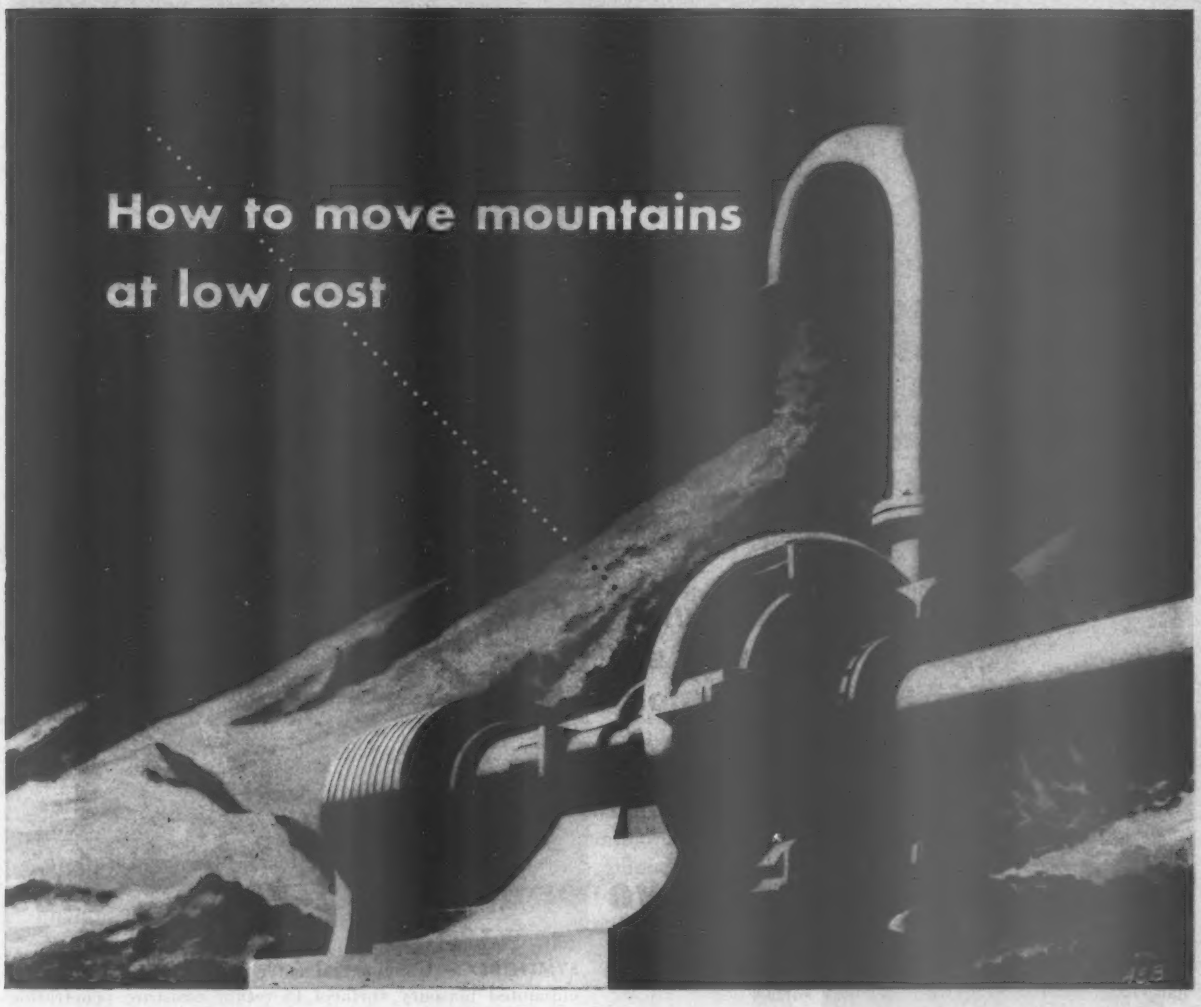

SLURRY, SAND, ASH OR GRAVEL . . . Amsco pumps lick them all

For 30 straight years, thousands of tons of coarse, abrasive ash have poured through an Amsco pump in a midwest power plant. This tough, wear-resistant unit not only has survived this severe wear but has cut handling costs by 65%. Another Amsco pump handling sharp toothed coal slurry turns out *double* the daily work, with 3 times the service life of the previous pump. Performance like this depends on good design and selection of the right metal for the job.

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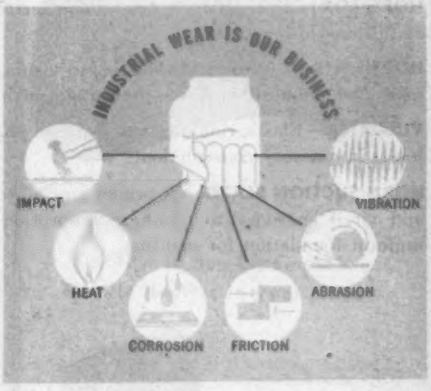
Years of practical field engineering experience have equipped our Amsco engineers to design or recommend the pump that will solve your pumping problem. Write Department C for illustrated literature.



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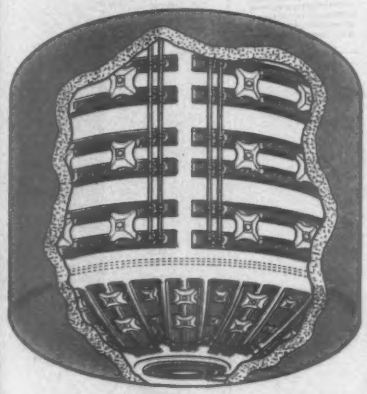
A Typical Strip Heater Application from Our Files



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Strip Heaters curved slightly as installed conform to shape of convex kettle bottom, while . . .

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IC-89

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Write for the data-packed Catalog 50 which describes many types of Chromalox Electric Heaters and how to apply them. It's yours without obligation.

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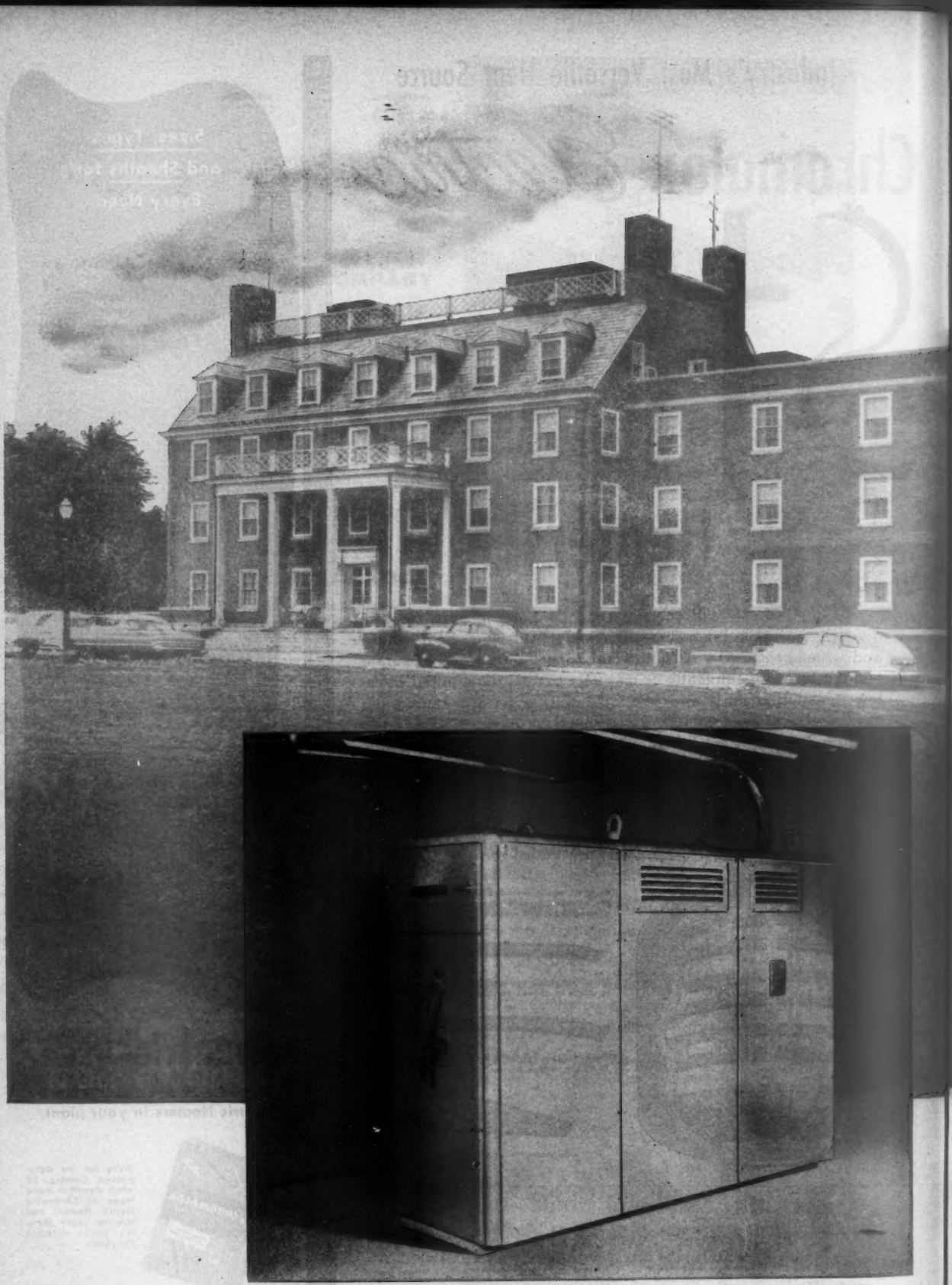

SAFER...More Dependable Power for Commercial and Industrial Building

The Shenango Inn, Sharon, Pennsylvania

Photo at left illustrates the Westinghouse "ASL" Power Center installed in the basement.

For safe and efficient power distribution, Westinghouse "ASL" Dry-Type Power Centers are the answer for industrial and commercial building. The Shenango Inn, for example, installed this most modern electrical equipment.

Here's a power center that is specially designed for efficient control of feeder circuits to supply both power and lighting. Easily installed, it comes as one complete unit with only two connections to make. Simply set the unit in place and connect both high and low-voltage feeders. In addition, you get these proved advantages:

COMPLETELY ENCLOSED FOR SAFETY. Power center is enclosed by sheet steel panels with all live parts covered for maximum protection. No oil or hazardous liquids used . . . no special protective vaults required.

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LIGHT WEIGHT . . . SMALL SIZE. Lighter, smaller Hipersil® cores are standard in all Westinghouse Power Centers. Because no heavy, bulky liquids are used, a heavy tank is not necessary. Approximately ⅓ less floor space required.

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Available in ratings 2,000 kva to 300 kva; high voltage 15,000 volts to 5,000 volts as "ASL". 300 kva and below, 5,000 volts and below as "AVR".

Call your nearest Westinghouse representative for complete information. Or write for Booklet B-4428, Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pennsylvania.

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RUGGEDLY built and of simple functional design, these new MILWAUKEE "SUPER" HOLE-SHOOTERS assure unmatched power and new cost-cutting performance for today's production requirements, as well as heavy duty maintenance.

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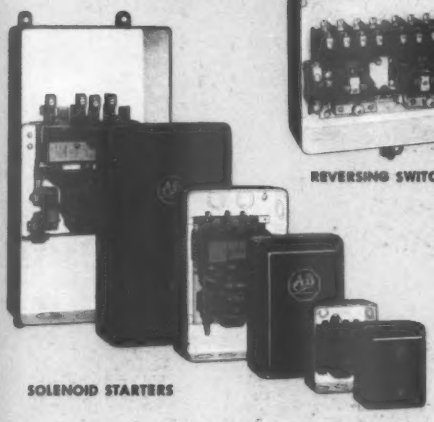
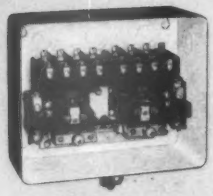
Your HANDY BUYING GUIDE

FOR SELECTING MOTOR CONTROLS



SOLENOID STARTERS



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MANUAL STARTERS

TIMING RELAYS

RELAYS AND CONTACTORS

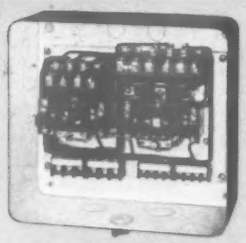
Have you one of these Handy Catalogs on your desk? If not, let us send you a copy.

This 92-page handbook on motor controls is written for the busy man who regularly specifies or buys manual or automatic starters, push buttons, limit switches, relays, timers, and other control components.

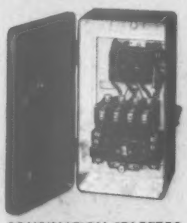
It is a valuable guide with dimensions, ratings, and prices, all arranged for quick and easy use. No matter what kind of control problem, whether manual or automatic, a.c. or d.c.—the Allen-Bradley Handy Catalog will help you.

The heart of the Allen-Bradley line is the time-tested A-B solenoid starter. It has maintenance free, double break, silver alloy contacts. Its simple one piece solenoid mechanism is trouble free. For quality control, specify Allen-Bradley.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.



MULTISPEED STARTERS



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STARTERS FOR SMALL MOTORS

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TROUBLE FREE MOTOR CONTROLS

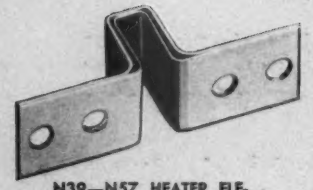
QUALITY

851-M

BULLETIN 709 SOLENOID MOTOR STARTERS...

FOR *Reliable* OVERLOAD PROTECTION

be sure to use the correct Heater Elements



N39—N57 HEATER ELEMENTS for motor full load currents 25 to 157 amp.

N17—N38 HEATER ELEMENTS for motor full load currents 2.68 to 22.9 amp.

NN4—N16 HEATER ELEMENTS for motor full load currents 0.19 to 2.41 amp.

Every Bulletin 709 solenoid starter has two reliable overload relays. The heater elements are supplied separately. Before installing a new starter, double check the heater elements—first, by noting their current rating as listed inside the starter cover;—second, compare this rating with the full load current rating of the motor. When these figures correspond with each other, you are assured of the most reliable overload protection. For complete safety for man, motor, and machine, always specify Bulletin 709 solenoid starters.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

851-M

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TROUBLE FREE MOTOR CONTROLS

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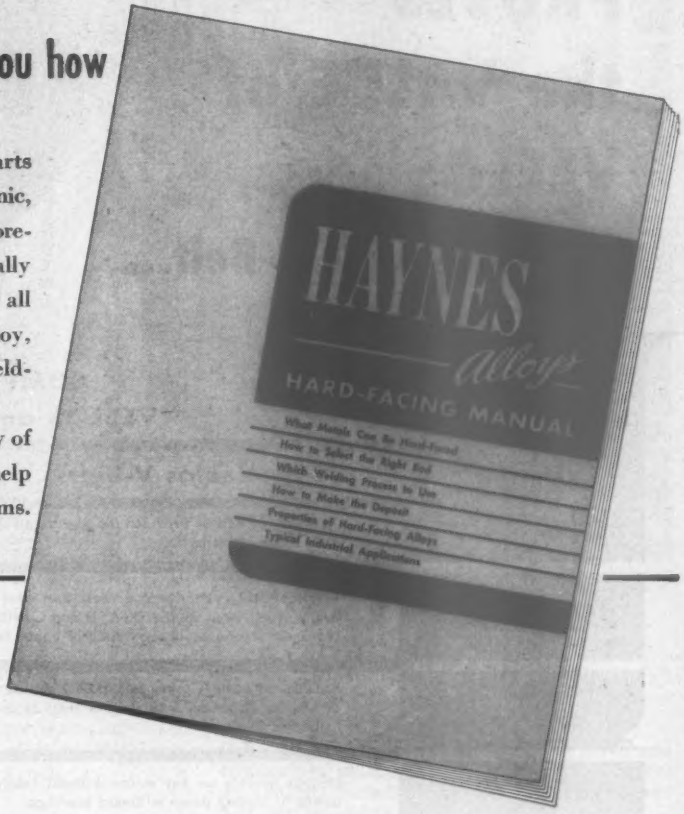
This NEW booklet tells you how

Every manufacturer or user of metal parts ... every welding engineer, master mechanic, maintenance superintendent, and plant foreman ... should have a copy of this really *complete* booklet on hard-facing. It takes all the guesswork out of choosing the right alloy, the right welding process, and the best welding procedures for applying the rod.

Use the coupon below to order your copy of this 40-page booklet. You'll find it a big help in solving most of your hard-facing problems.



Here is What's in it—

Which Metals Can Be Hard-Faced—

A 2-page chart listing 21 metals...and recommending suitable hard-facing rods for each.

How to Select the Right Rod—

Factors to consider in making your selection and a comparison of the characteristics of hard-facing deposits.

Which Welding Process to Use—

Where and why to use oxy-acetylene, metallic-arc, HELIARC, mechanized oxy-acetylene, or UNIONMELT welding for applying hard-facing materials.

How to Make the Deposit—

Detailed, step-by-step instructions for applying HAYNES hard-facing alloys by both the oxy-acetylene and metallic-arc welding processes.

Properties of HAYNES Hard-Facing Alloys—

Description, properties, and available sizes of 12 hard-facing materials.

"Haynes," "Heliarc" and "Unionmelt" are trade-marks of Union Carbide and Carbon Corporation.

HAYNES Trade-Mark Alloys

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Please send me, without obligation, a copy of the new booklet "HAYNES Alloys—Hard-Facing Manual."

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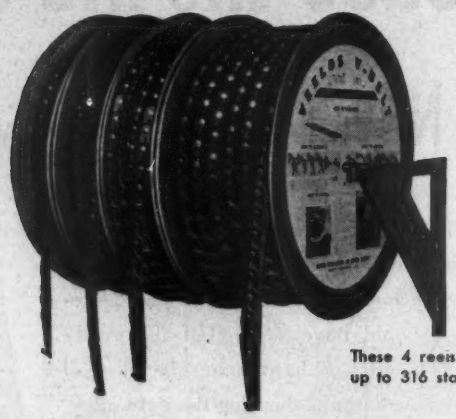
COMPARISON PROVES the VALUE of VEELOS the Adjustable V-Belt...

IF you use v-belts you'll be interested in this clear statement of facts about VEELOS, the link v-belt, and endless v-belts.



These 4 reels of Veelos provide up to 316 standard v-belt sizes.

COMPARISON TABLE
VEELOS and ENDLESS V-BELTS

Veelos V-Belts	Endless V-Belts
Any length can be provided for *any* v-belt drive due to link construction.	Standard or special lengths must be supplied for *individual* drives.
MINIMUM INVENTORY. 4 reels can care for every v-belt need in the O, A, B and C widths. No deterioration or obsolescence of spare belts.	LARGE INVENTORY. 316 sizes are required to provide a *complete* stock in the O, A, B and C widths. Spare belts not immediately used will age and deteriorate.
SMALL SPACE. It takes less than 2 square feet of wall or floor space to store 4 reels of easily identified Veelos.	LARGE SPACE. Walls and ceilings are often covered with stocks of endless v-belts. Identifying and maintaining full stocks is difficult and costly.
Installs quickly *on any drive* without resetting motor or tearing down outboard bearings.	Necessary to reset motor and tear down drives with outboard bearings.
Belts can be adjusted or replaced without moving the motor.	Sliding or pivoted motor bases are necessary to replace endless v-belts. Belts cannot be adjusted individually.
Full power delivery can be maintained because the tension of each belt in a matched set is kept uniform by removing or adding links.	Individual belts cannot be adjusted to maintain uniform tension and provide full power delivery.
No limitations are imposed by belt length.	Limited by the availability of standard or special belt lengths.

If you would like to learn more about Veelos—how it can save you money and keep your machines producing—write today for your copy of the Veelos Data Book. It's free and full of facts!

VEELOS
THE LINK
V-BELT

MANHEIM MANUFACTURING & BELTING COMPANY
MANHEIM, PENNSYLVANIA

...ADJUSTABLE TO ANY LENGTH...ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof and static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

OPERATES in 6-Ft. aisles

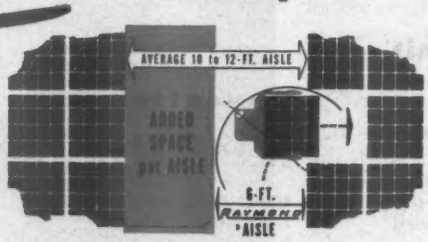
RAYMOND *Electric* TIERING TRUCK
3,000 lb. Capacity

● RAYMOND Electric Tiering Truck maneuvers with ease in this 6 ft. storage aisle.

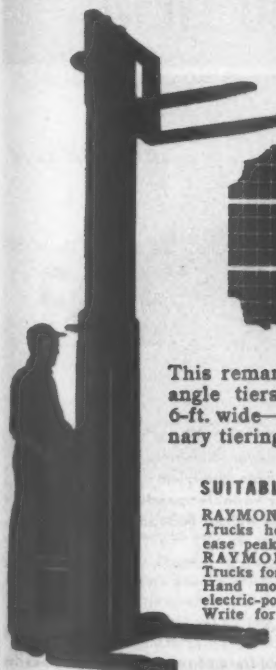
● Standard telescopic-type RAYMOND Electric Tiering Truck elevates forks up to 130" high.

Four to six feet...

that's what you lose each aisle, using conventional-type tiering trucks! Yet, you can turn that lost space into extra storage with a RAYMOND Electric Tiering Truck.



This remarkable rider-type truck actually right-angle tiers 48" x 48" loads from aisles only 6-ft. wide—just half the width demanded by ordinary tiering trucks.



SUITABLE FOR SHORT HAULS

RAYMOND Hydraulic Pallet Lift Trucks help out on short hauls, ease peak period handling — free RAYMOND Electric Tiering Trucks for long hauls and tiering. Hand models or new rider-type electric-powered models available. Write for Bulletins 223 and 750.

REQUEST BULLETIN

Pioneers Since 1840

RAYMOND

- ELECTRIC INDUSTRIAL TRUCKS
- HYDRAULIC ELEVATING EQUIPMENT

RAYMOND Electric Tiering Truck. Model E2ST. Straddle-type, telescopic. Capacity 3,000 lbs. Also in 2,000-lb. capacity models.

*Patent No. 2,564,002

Patented* Features:

IT'S SO COMPACT

Patented* RAYMOND offset wheel drive and elimination of counter-weight shorten overall length. Result: it right-angle tiers from 6-ft. aisles—adds up to ⅓ more storage.

IT'S SO MANEUVERABLE

Short overall length and patented* offset drive wheel with 200° turning arc enable it to maneuver like magic. Patented* knee-action swivel caster compensates for uneven floors. Travels up to 4 mph empty, 3⅓ mph loaded. Ideal for warehousing, rail loading, unloading.

IT WEIGHS SO MUCH LESS

Compact construction, plus no counter-weight, produce far lighter truck. Operates in low-capacity elevators, on lighter-capacity floors—has lower battery capacity requirements and costs less to run.

GET THE FACTS Send for Bulletin 730 today. And be sure to ask for a demonstration—you have to see this remarkable RAYMOND Electric Truck to believe it!

The RAYMOND CORPORATION

Formerly LYON-*Raymond Corporation*
3260 Madison St., Greene, N.Y.

Gentlemen: Please send me Bulletin 730 on your new Electric Tiering Truck. I'm interested in a demonstration: ☐ Yes ☐ No.

Name..... Title.....

Company.....

Street.....

City..... State.....

The original, mechanically correct unit for providing complete, stepless speed adjustability.

Industry's most widely used unit for adjusting machine speeds . . . for all these good reasons:

1. Incorporates the REEVES operating principle—proved in 300,000 installations—which assures *accurate, positive* delivery of any desired speed within the entire speed range, without stopping the machine.

2. Makes "changeovers" easier—utilizes the machine's *full* capacity—by providing the *right* speed—with the turn of handwheel or touch of button—for every operation and every operator, under every changing condition.

3. Wide choice of vertical and horizontal models—capacities up to 87 hp; in speed ratios of 2:1 to 16:1; manual, electric, hydraulic or completely automatic controls; suitable for mounting in any position. Also "Internals" for mounting within machine framework.

4. Easily installed on your machines. Ruggedly constructed with few moving parts subject to wear . . . requires no special tools or training to maintain.

5. Used on more different kinds of machines in a greater variety of industries than any other single variable speed drive.

Profit from REEVES Speed Control in your plant—*see immediate results.* Send for full details on REEVES Speed Control—ask for Catalog No. F68a-g.

Operating Principle

REEVES Variable Speed Transmission embodies the proved operating principle of a V-belt driving between two pairs of cone-shaped discs, mounted on parallel shafts and adjustable to form an infinite number of driving and driven diameters. One shaft receives power at constant speed from motor, line shaft, etc. Other shaft delivers power at infinitely variable speeds to driven machine. Each speed setting is held without fluctuation. Operation is practically noiseless.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Recognized leader in the specialized field of speed control engineering

accurate · variable
REEVES *Speed Control*

NEW! the low-cost* COPYFLEX "20"

With this new, low-cost whiteprinter, the Copyflex "20", you no longer need wait for prints. You get them *when* you want them, *as* you want them—for only 2¢ (average) per. sq. ft.! And that includes *all* costs . . . material, labor, depreciation, etc.

The Model 20 is a completely new, medium volume machine that sells for the lowest price of any machine in its class. It has a full 46″ printing width, takes cut or roll stock, and delivers completely developed, ready-to-use prints. It requires no installation, no special training to operate.

Besides making prints of your engineering drawings, it quickly copies production orders, specifications, accounting reports, and other vitally needed paperwork. See how the Model 20, or one of our other models, can help you. Clip the coupon now and you'll be on the road to faster copying – at substantial savings.

Compare these advantages:

- *LOWEST PRICED machine of its class available.
- **NO FUMES.** Bruning Copyflex machines use no vapor developer, therefore cannot possibly emit unpleasant fumes.
- **NO INSTALLATION.** No exhausts needed. Just connect to a 115 volt AC electric power circuit.
- **NO TRAINED OPERATOR NEEDED.** Your secretary, the office boy, or anyone else can operate a Copyflex without special training.

BRUNING

Specialists in copying since 1897

CHARLES BRUNING COMPANY, INC.

Dept. F-121 **100 Reade St.** **New York 13, N. Y.**

☐ Send me full details on the Model 20 Copyflex.

☐ I would like to see a Copyflex machine demonstrated.

Name_____ Title_____

Company_____

Street_____

City_____ Zone____ State_____

Putting on the FINISHING touch is a cinch...

MAGNESIUM

Yes, putting a protective finish on magnesium can be done easily, economically and with satisfactory results. The procedures used do not differ greatly from those employed with other metals. After thorough cleaning, a chemical finish is applied and this is followed by the desired paint coating. The important considerations are the proper choice of chemical treatment and paint materials.

Dow has exposed thousands of paint test panels to determine the best paint materials and the most efficient complete paint systems. As a result, paint systems are available which meet normal requirements and combine adequate protection with attractive decorative characteristics. Detailed recommendations are available for conditions under which magnesium is used in service ranging from baked enamel systems for office machines to weather-resisting, air-dried primers and finishes for truck bodies and trailers.

For complete information on finishing methods call your nearest Dow sales office or write direct.

THE DOW CHEMICAL COMPANY
Magnesium Department • Midland, Michigan
New York • Boston • Philadelphia • Atlanta • Cleveland • Detroit
Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto, Canada

HYSTER® INDUSTRIAL TRUCKS

are at work in *Every* major industry ...in thousands of businesses

Firms all over the world are slashing materials handling costs with Hyster Fork-type Lift Trucks, Straddle Trucks, Karry Kranes and Turret Trucks . . . Other costs go up but materials handling costs CAN go down.

In 1951 (even exclusive of government orders) Hyster industrial truck volume was the largest in Hyster history. Hyster sales (again exclusive of government orders) are nearly equally divided between present Hyster owners and entirely new owners.

REPEAT BUSINESS means customer satisfaction. NEW BUSINESS proves customer preference.

Here is a partial list of businesses in which Hyster trucks are saving time, money, manpower. If your business is listed, we can give you up-to-date materials handling information. See your Hyster dealer or write direct to us.

- ☐ ABRASIVE MFG.
- ☐ AIRCRAFT & AIRCRAFT PARTS MFG.
- ☐ AIRLINES
- ☐ APPAREL MFG.
- ☐ AUTOMOBILE, TRUCK & BUS MFG.
- ☐ AUTO SUPPLIES & PARTS MFG.
- ☐ AUTO SUPPLIES, PARTS WHOLESALERS
- ☐ BAKERIES
- ☐ BOAT AND SHIPBUILDING
- ☐ BOILER AND TANK MFG.
- ☐ BOTTLING, SOFT DRINK MFG.
- ☐ BOTTLING & BEVERAGE WHOLESALERS
- ☐ BREWERIES, DISTILLERIES, WINERIES
- ☐ BRICK MFG.
- ☐ BUILDING MATERIALS MFG.
- ☐ BUS LINES
- ☐ CEMENT MFG.
- ☐ CERAMIC AND POTTERY MFG.
- ☐ CHEMICAL MFG., GENERAL
- ☐ COMMERCIAL FARMS
- ☐ CONCRETE BLOCK & PIPE MFG.
- ☐ CONCRETE PRODUCTS MFG., GEN'L
- ☐ CONSTRUCTION, BUILDING, HOUSING
- ☐ CONSTRUCTION, GENERAL
- ☐ CONVEYOR MFG.
- ☐ COOPERAGE
- ☐ COTTON COMPRESS & WAREHOUSES
- ☐ COTTON & TEXTILE WHOLESALERS
- ☐ COTTON OIL MILLS
- ☐ DAIRY PLANTS
- ☐ DEPARTMENT & MAIL ORDER STORES
- ☐ ELECTRICAL EQUIPMENT MFG.
- ☐ ELECTRICAL GOODS WHOLESALERS
- ☐ ENTERTAINMENT, AMUSEMENT FIRMS
- ☐ FARM IMPLEMENT MFG.
- ☐ FERTILIZER MFG.
- ☐ FISH PACKERS
- ☐ FOOD DEHYDRATORS, PROCESSORS
- ☐ FOUNDRIES
- ☐ FRUIT & VEGETABLE CANNERIES
- ☐ FURNITURE MFG.
- ☐ GLASS MFG.
- ☐ GOVERNMENTAL ORGANIZATIONS
- ☐ GRAIN AND FLOUR MILLS
- ☐ GROCERY AND SUPER MARKETS
- ☐ HAND TOOL MFG.
- ☐ HARDWARE MFG.
- ☐ HEATING & REFRIGERATING MFG.
- ☐ LAUNDRIES & BLEACHERIES
- ☐ LEATHER PRODUCTS MFG.
- ☐ LUMBER REMANUFACTURERS
- ☐ LUMBER SAWMILLS & PLANING MILLS
- ☐ LUMBER WHOLESALERS & RETAILERS
- ☐ MEAT PACKERS
- ☐ MACHINE SHOPS
- ☐ MACHINERY & EQUIPMENT DISTR'S.
- ☐ MACHINE TOOL MFG.
- ☐ MACHINERY & EQUIPMENT MFG.
- ☐ METAL & STRUCTURAL STEEL MFG.
- ☐ METAL STAMPERS
- ☐ MINING, COAL
- ☐ MINING, METAL
- ☐ MINING, NON-METALLIC
- ☐ MINING EQUIPMENT MFG.
- ☐ MISC. FOOD PRODUCTS MFG.
- ☐ MOTOR MFG.
- ☐ OIL FIELD EQUIPMENT MFG.
- ☐ ORDNANCE MFG.
- ☐ OXYGEN, ACETYLENE & GAS MFG.
- ☐ PAINT & VARNISH MFG.
- ☐ PAPER & PULP PRODUCTS MFG.
- ☐ PAPER BOX MFG.
- ☐ PAPER BAG MFG.
- ☐ PETROLEUM BULK TANK STATIONS
- ☐ PETROLEUM REFINERIES
- ☐ PLASTICS MFG.
- ☐ PLATING & PAINTING
- ☐ PLUMBING EQUIPMENT MFG.
- ☐ PLYWOOD MFG.
- ☐ POULTRY PROCESSORS
- ☐ PRINTING & PUBLISHING
- ☐ PUBLIC UTILITIES
- ☐ RADIO & COMMUNICATION EQUIPMENT MFG.
- ☐ RAILROADS
- ☐ RAILROAD CAR & EQUIPMENT MFG.
- ☐ RUBBER PRODUCTS MFG.
- ☐ RUG & CARPET MFG.
- ☐ SCIENTIFIC INSTRUMENT MFG.
- ☐ SCRAP METAL & JUNK YARDS
- ☐ SCREW PRODUCTS MFG.
- ☐ SEED & FEED WHOLESALERS
- ☐ SOAP MFG.
- ☐ STEEL WAREHOUSING
- ☐ STEVEDORING
- ☐ STOVE MFG.
- ☐ SUGAR & CONFECTIONERY MFG.
- ☐ TEXTILE & APPAREL WHOLESALERS
- ☐ TEXTILE MILLS
- ☐ TOBACCO MFG.
- ☐ TOBACCO WHOLESALERS
- ☐ TRAILER MFG.
- ☐ TRUCK LINES
- ☐ UPHOLSTERERS & MATTRESS MFG.
- ☐ WAREHOUSING & STORAGE
- ☐ WIRE ROPE & CABLE MFG.
- ☐ WOODEN BOX MFG.
- ☐ WOOD PRESERVING PLANTS

HYSTER COMPANY

THREE FACTORIES

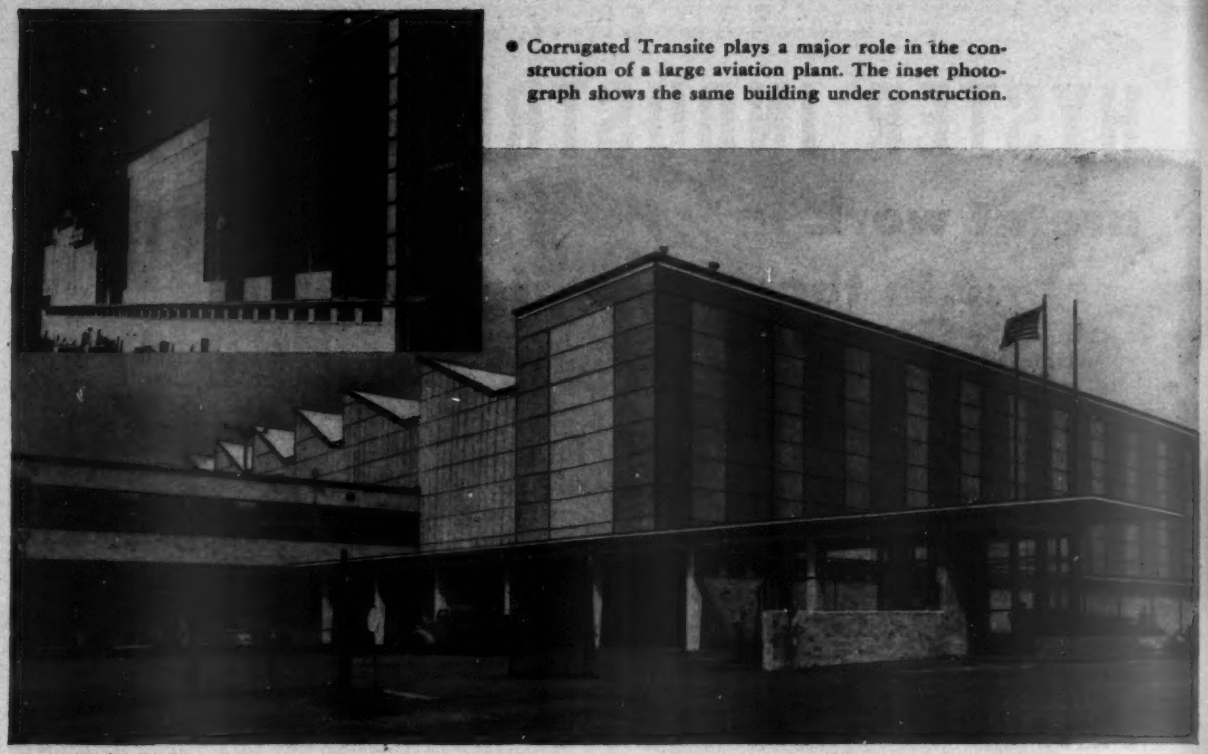
2956 N.E. CLACKAMAS STREET, PORTLAND 8, OREGON
1856 NORTH ADAMS STREET . . . . PEORIA 1, ILLINOIS
1056 MEYERS STREET . . . . . DANVILLE, ILLINOIS

HYSTER 20 (2,000 lbs. capacity). One of 5 fork-type models from 2,000 to 15,000 lbs. cap.

HYSTER STRADDLE TRUCK®. Two models of 18,000 and 30,000 lbs. capacity.

HYSTER KARRY KRANE®. Versatile mobile crane with 10,000 lbs. hoisting and transporting capacity.

HYSTER TURRET TRUCK. Horizontal transporting unit. 4,000 lbs. capacity. 4 models.



● Corrugated Transite plays a major role in the construction of a large aviation plant. The inset photograph shows the same building under construction.

CORRUGATED TRANSITE* *For expansion in essential industries*

*Transite is a registered Johns-Manville trade mark

Because it goes up fast . . . requires a minimum of framing . . . Johns-Manville Corrugated Transite, the large asbestos building sheet, is ideal for defense construction.

Made of two practically indestructible materials, asbestos and cement, Corrugated Transite is fireproof, rotproof, and rustproof. The large, easy-to-handle sheets with their unusual strength provide durable, weatherproof walls and roofs.

With a minimum of framing required, sheets of Corrugated Transite are quickly and easily applied . . . construction costs are greatly reduced. When conversion or expansion is necessary, these sheets can be salvaged and re-used.

The natural stone-gray color of Transite is attractive without further decoration—it never needs preservative treatment. This modern building sheet with its streamlined corrugations and attractive shadow lines has great architectural appeal and is being increasingly used—inside as well as out.

If you're planning construction that you want to build fast, look well, last long—investigate Johns-Manville Corrugated Transite! For full details write Johns-Manville, Box 158, Dept. F-10, New York 16, N. Y. In Canada, write 199 Bay Street, Toronto 1, Ontario.

EASY TO FASTEN TO STEEL

EASY TO SAW

EASY TO DRILL

EASY TO NAIL TO WOOD

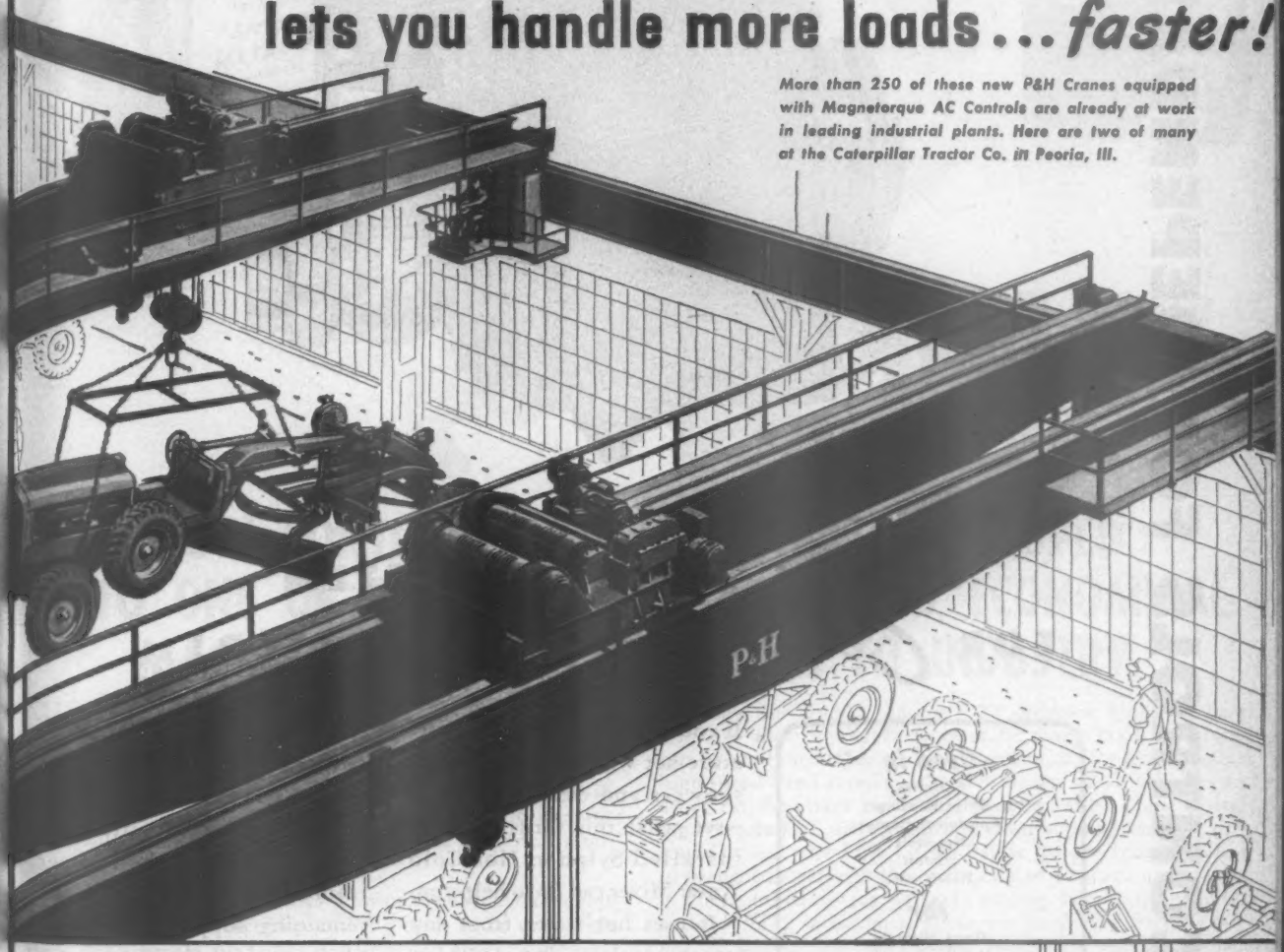
Johns-Manville *Asbestos* CORRUGATED TRANSITE

P&H

OVERHEAD CRANES

MAGNETORQUE*

lets you handle more loads... *faster!*



More than 250 of these new P&H Cranes equipped with Magnetorque AC Controls are already at work in leading industrial plants. Here are two of many at the Caterpillar Tractor Co. in Peoria, Ill.

You'll be amazed how simple — how completely responsive this control can be — under *all load conditions!* Speed when you want it — precision when you need it. Unexcelled performance! This kind of crane service means faster, easier handling of *every* load — *more work per shift* in busy plants.

And far fewer service interruptions, too. Magnetorque eliminates the old mechanical load brakes. There's no frictional wear — no bothersome adjustments to waste your time — no control contacts to maintain. And Magnetorque will last the life of your crane.

* T. M. of Harnischfeger Corporation for electro-magnetic type brake.

OVER 17,000 P&H CRANES SERVE AMERICAN INDUSTRY... FAR MORE THAN ANY OTHER

P&H

"job engineered" to fit your needs

P & H

OVERHEAD CRANES

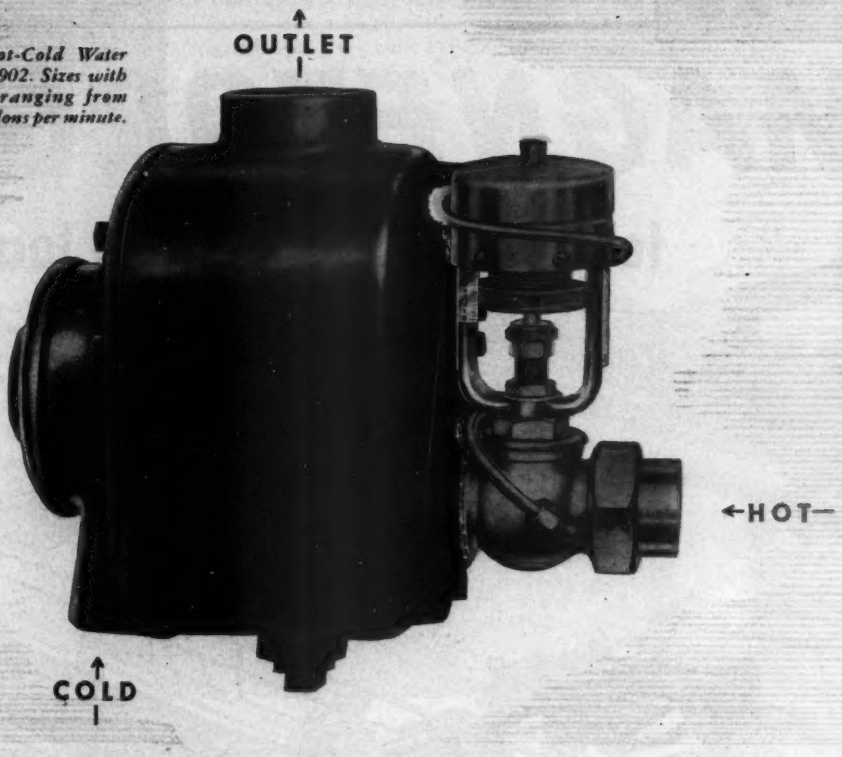
4525 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

OVERHEAD CRANES • ELECTRIC HOISTS • EXCAVATORS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • CRAWLER AND TRUCK CRANES • DIESEL ENGINES • PRE-ASSEMBLED HOMES

SYLPHON CONTROLS FOR DEPENDABILITY

Sylphon Hot-Cold Water Mixer No. 902. Sizes with capacities ranging from 5 to 131 gallons per minute.



SPECIAL DELIVERY SYSTEM FOR *Constantly* HOT WATER!

Used in
Factories
Office Buildings
Apartment Houses
Hospitals
Schools
Hotels, etc.

for
Gang showers
Needle showers
Continuous baths
Wash fountains
Process water for packing houses, bakeries, dairies, garages, other industries

If you require constant temperature hot water for processing, showers and other operations—see what this thrifty, easily-installed Sylphon Hot-Cold Water Mixer can do to help you.

It uses hot water from any storage tank or instantaneous heater. It regulates the amount of cold water required to temper it to the desired degree. Water is actually mixed together before delivery. Temperature remains constant—even if supply water temperature or pressure fluctuates. Everything works automatically—dependably!

Here's an extra advantage. If either hot or cold water supply fails, the Sylphon Mixer immediately shuts off the remaining supply. When supply is returned, the Mixer starts operating again.

Sylphon Hot-Cold Water Mixers are self-contained, self-powered, ruggedly built. Adjustable temperature range. For complete information, write Department XF.

Temperature Controls • Bellows Devices • Bellows Assemblies

FULTON SYLPHON
DIVISION

FIRST WITH BELLOWS

ROBERTSHAW-FULTON CONTROLS CO., KNOXVILLE 4, TENN

Canadian Representatives, Darling Brothers, Montreal

DoALL'S PHENOMENAL EVOLUTION

HOW CONTOUR MACHINING WAS DEVELOPED INTO ONE OF THE MOST VERSATILE AND ECONOMICAL MACHINING PROCESSES KNOWN TO INDUSTRY

WHEN the idea of "Contour Sawing" was first introduced, the DoALL was primarily recognized for its speed in cutting dies. Great savings in time and material resulted wherever this new principle of slicing off a whole section (instead of removing one chip at a time) was used. As a result, uses for this revolutionary machining process began to multiply immediately.

New application possibilities prompted new developments in machines and, of necessity, in band tools to be used with them. For example, blade life was increased from 23 minutes to 300 minutes in slicing through 1" thick tool steel.

These improvements opened up further new production applications. With the increase in applications and better band tools, much heavier machine construction, closer control of feeds, speeds, etc., along with use of coolants, became necessary.

Today the DoALL employs 27 different kinds of band tools, so that on the Contour-matic every known material can be machined. One of these band tools, for example, is a high-speed band carrying abrasive stones which achieves another revolutionary machining process called "Line Grinding." Instead of merely cutting from a point tangent to a round wheel, the Line Grind Bands do precision grinding in hardened steel over the entire face of a curved or flat area.

There are bands for not only sawing, but filing, grinding and polishing operations. There are bands for friction sawing of ferrous materials, knife bands for parting rubber, paper and pliable substances. There are bands with diamonds impregnated on the edge for cutting ceramics and other brittle materials.

The new DoALL with its many cutting tools is today the most versatile of all machine tools. We invite your inquiry for a *demonstration* in your plant on your work to prove these claims.

The DoALL Company
254 N. Laurel Ave., Des Plaines, Illinois

B-8

DoALL

33 Sales-Service Stores

SEND FOR CATALOG
Learn of the complete machining facilities available to you in the modern DoALL Contour-matic.

Machine Tools . . . Gaging Equipment . . . Tool Steel . . . Band Tools . . . Metal Working Supplie

Caster Quiz

A "quick facts" feature with helpful suggestions on the use of casters . . . to reduce materials-handling costs, the "Reducible 30%."*

Bassick's "Floating-Hub" Caster rides over bumps without lifting the load. It comes in a wide range of sizes (6 to 16 in.) for a wide range of jobs. Write for Catalog 124A for information on the complete line of truck casters, including data on "Floating-Hub".

Q What's the "Floating-Hub"?

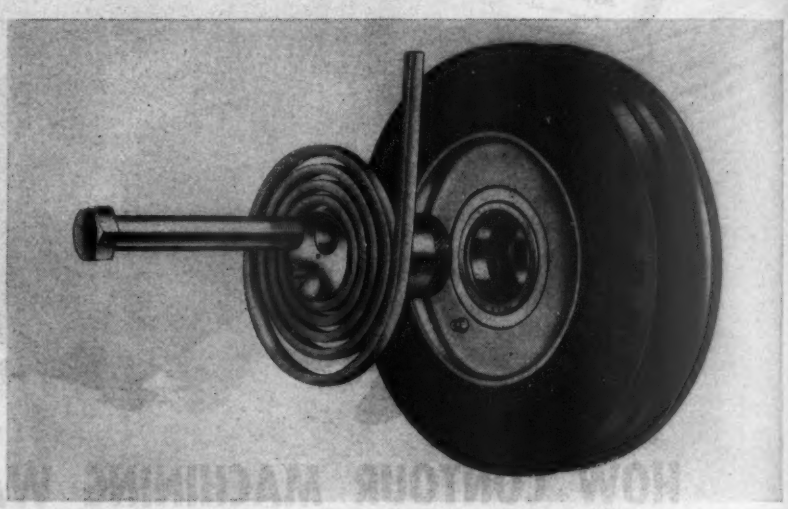
A A shock-absorbing mechanism built in wheels and casters, providing mechanical resiliency between the rim of a wheel and the axle.

Q Is it important?

A It is the most important development in wheel and caster construction in years. "Floating-Hub" applies a "knee-action" principle to wheels and casters.

Q How does it work?

A A hub, on which the wheel revolves, "floats" in the frame, controlled by a spring of predetermined capacity which holds the wheel in balanced position.



Sprung wheels make trucks and portable equipment as easy riding as your car.

Q What does this accomplish that ordinary casters will not do?

A The unique spring suspension construction of "Floating-Hub" has many exclusive advantages. It *absorbs shock, noise and vibration . . . prolongs truck and caster life . . . protects loads . . . saves floor wear* . . . keeps all wheels in constant contact and under load.

Baggage carts and trailers can be towed at high speeds with "Floating-Hub" Casters.

Q Why should you buy Bassick Casters from a local industrial distributor?

A Bassick believes in this form of distribution because it means faster, better service for you. Your distributor, handy as your phonebook, carries stock to give you quick, inexpensive deliveries, and is a convenient source of information. Write us for the name of your nearest Bassick distributor.

THE BASSICK COMPANY, Bridgeport 2, Conn. Division of Stewart-Warner Corp. *In Canada:* Bassick Division, Stewart-Warner-Alemite Corp., Ltd., Belleville, Ont.

***** *According to cost analysts, materials-handling (about 30% of total cost) affords about the only real opportunities for cost reduction today.*

SEE OUR CATALOG IN SWEET'S

Bassick

MAKING MORE KINDS OF CASTERS . . . MAKING CASTERS DO MORE

This machine practically thinks for itself!

It's uncanny the way this DeVlieg JIGMIL handles the most complex boring and milling operations *automatically*, simply by pushing a button on the control panel.

For example — by simple push button control, the workpiece is positioned both horizontally and vertically, and holes are automatically spaced and bored to exact tolerances. A unique index table allows machining of parts from four sides without rechucking. A power tool lock permits locking or releasing cutting tools in a few seconds.

Howell engineers worked closely with this manufacturer to make sure each of the five Howell motors fitted its job exactly. The three 2-speed and two single-speed Howell motors make a vital contribution to the remarkable efficiency of this machine.

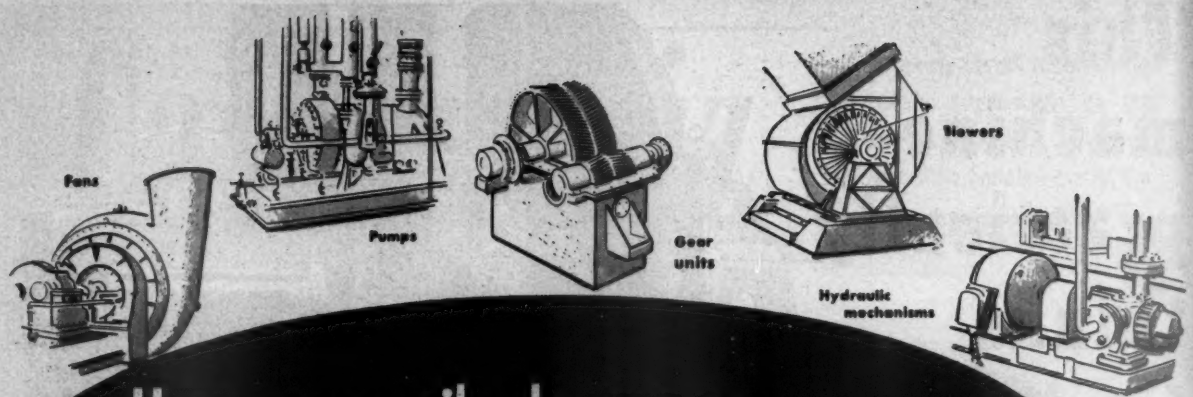
Howell will supply the same high degree of engineering skill and experience to your problems. You are assured of quality motors designed for your specific requirements, built to stand up under the heaviest production loads. May we handle your electric motor needs?

HOWELL Red Band MOTORS ®

HOWELL MOTORS

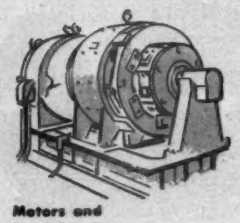
HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Precision-built industrial motors since 1915



How many oils do you use for auxiliary plant equipment?

You need only GULF HARMONY OIL


Motors and generators

—Outstanding many-purpose oil for equipment like this!

You can lubricate all your plant auxiliary equipment better with just this one oil—Gulf Harmony Oil. It's equally effective for sleeve-type and antifriction bearings, hydraulic mechanisms, compressor cylinders, and many types of gears.

Here are a few of the many reasons why Gulf Harmony Oil performs so well in so many different applications. First, it has high resistance to oxidation and the formation of sludge. In oil circulating systems, reservoirs, hydraulic systems, and antifriction bearing pedestals, this means freedom from harmful deposits and insures against premature oil changes.

Then the lubricating film provided by Gulf Harmony Oil has preferential wetting characteristics for metal—it displaces moisture, interrupts its corrosive action. That's how this quality oil prevents rust on all oil-bathed surfaces—a particularly important function in precision hydraulic valves and in antifriction bearings operating under damp conditions.

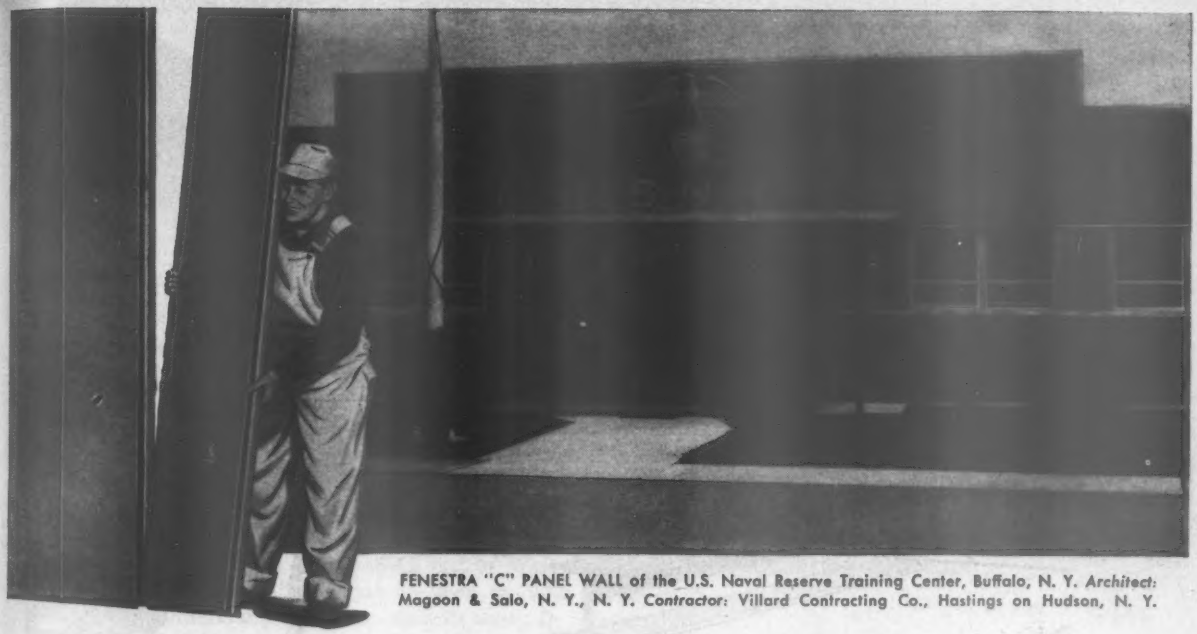
And because it has good water-separating characteristics, there is less chance of emulsification and the useful life of each fill is prolonged.

Gulf Harmony Oil is available in a wide range of viscosities and is inhibited to provide more effective protection against wear under boundary conditions.

For further information on Gulf Harmony Oil and for expert help on your lubrication problems, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company,
Gulf Building, Pittsburgh 30, Pa.

FIFTY YEARS OF SERVICE
1901 GULF 1951
PETROLEUM AND ITS PRODUCTS



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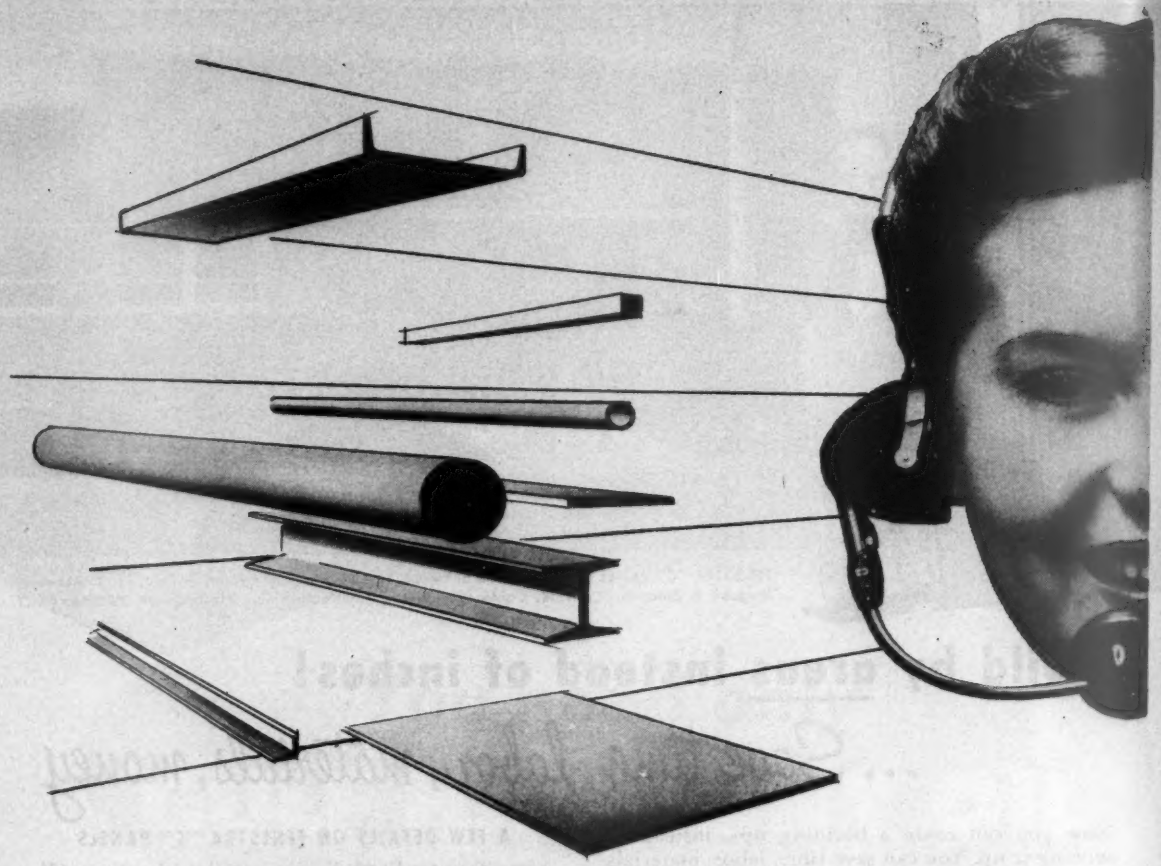

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FACTORY
MANAGEMENT and MAINTENANCE
WHAT YOU NEED TO KNOW FROM WASHINGTON ★ WHAT YOU NEED
Mobilization Communique No. 17

The Controls You Face in 1952

By CARROLL W. BOYCE • National Affairs Editor, FACTORY

You've been living with government controls for about a year now. Materials and production controls. Wage and salary controls. Price controls.

At times, they have been rolling out of Washington so fast it has been a full-time job to keep up with them—much less understand what the controls mean in relationship to each other.

But you need to have a look at the over-all picture. You need to know what *kind* of controls you must live with. How they affect the way *you*, as a plant operating executive, conduct yourself and your business. In general, how they affect all business.

During 1951, the control machinery has been developed, changed, and modified. It is now possible to get a good look at 1952 by reviewing the situation as it exists today. Sure, there will be some new controls during 1952; some of the present controls will be modified. But barring a major change in the world's political condition, there will not be any big changes in the control pattern.

Just a word of warning: In every company there is one man—perhaps a few men—who must know everything about every government regulation affecting the company.

If you are one of those individuals, we think you'll find this report interesting as an over-all review. We believe you'll find it helpful, too. But by way of giving you a new understanding—a better perspective. Not by giving you all the fine print and legal interpretations.

We're not trying to kid either you or ourselves: There's only one place you can get complete information, if that's what you need. That's by referring to official texts, or by consulting a field office of the agency responsible for the regulation in question.

Part I of this report covers all material and production controls which concern FACTORY's readers—plant operating executives in the manufacturing industries.

Controls primarily affecting mining, utilities, transportation, etc., are excluded as non-manufacturing.

Part II, coming in January, will review wage and salary controls. Meantime, don't miss "What the Changing Salary Rules Mean to You," by the executive director of the Salary Stabilization Board, on page 68 of this issue.

Price controls, being the direct concern of financial, sales, and purchasing executives, are excluded as not of primary interest to plant operating executives.

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PART II • WAGE AND SALARY CONTROLS

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Complete review . . . . . January 1952

MATERIAL AND PRODUCTION CONTROLS

ALL MATERIAL AND PRODUCTION CONTROLS are issued and administered by the Defense Production Administration (DPA)—or one of the agencies responsible to DPA. Of these "second line" agencies, the most important is the National Production Authority (NPA). It's the only one of real consequence to manufacturing.

The "policy statements" of NPA are contained in two series of regulations.

"NPA regulations" establish the basic rules with regard to inventories, priorities, and appeals.

"CMP Regulations" establish the rules with regard to steel, copper, and aluminum — the basic metals of the nation's economy.

The "operating procedures" of NPA are expressed in a series of "M" orders.

"M" orders tell you what you can and can't do with respect to specific materials or products.

To understand and interpret either the policies or the procedures, you have to start by knowing what is meant by 25 terms of Washington "controlese." If you know these terms and what they mean, you have a pretty good grasp of the basic policies of the NPA and CMP regulations.

Here's your dictionary of controlese:

THE BASIC PRIORITY SYSTEM

The basic priority system covers all products and materials *except* steel, copper, and aluminum. Those are covered by a separate system—the Controlled Materials Plan (see next page).

DO RATING · The "DO" is the "standard" priority. The specific rules governing its use are in NPA Regulation 2.

There are three ways in which a DO rating can be initiated:

1. It can be authorized by the terms of an order placed by a government agency.

2. It can be "approved" by certain government representatives for use on orders to obtain machine tools and other production equipment for use in working on government orders.

3. It can be "self-applied" by manufacturers: (a) to orders for maintenance, repair, and operating supplies (b) to orders placed in connection with "small user self-allotments."

The DO is always followed by a suffix which identifies the "program" the rating is connected with: aircraft, tanks, ships, MRO, consumer goods, military construction, "small users," etc.

All DO-rated orders have equal priority. They are filled in the order received, as long as meeting the delivery date required by a DO order does not interfere with performance on the DO's you have previously accepted.

There's one possible exception: If you find you cannot fill *on schedule* all the DO's you have already accepted, then you give preference to DO orders with suffixes A, B, C, and E.

"REJECTION" OF DO ORDERS · You can reject a DO-rated order under three circumstances:

1. If you can't make delivery from stock or production within the time specified in the order.

2. If you already have on hand DO-rated orders up to a percentage of your scheduled production specified in an "M" order that applies to the material or product ordered. (Not all "M" orders contain such limitations.)

3. If the DO-rated order does not reach you before the "lead time" specified in the applicable "M" order. Lead time is expressed as a specified number of days before the first day of the month in which delivery is required. The purpose is to prevent undue disruption to production schedules through last-minute re-scheduling to fill rated orders. (If you get a rated order before lead time, and still it will cause you to lose substantial production, you can appeal to NPA for special permission to reject that particular order.)

"EXTEND" A DO ORDER · This is the process by which you obtain the materials and components necessary to fill a DO-rated order placed on you.

Once the "original manufacturer" gets a DO from a government agency, he can "extend" it to his suppliers, and so on.

You cannot, under any circumstances, extend a DO rating used to purchase Class B products. (See definition of Class B products, below.)

There are some materials that cannot be obtained by extension of DO ratings. One big class of materials—basic chemicals—can be obtained only with a few specified DO ratings. Other exceptions are mentioned in the various "M" orders.

DX RATING · This is a super-priority for breaking bottlenecks (usually on components) in urgent military production programs.

It takes precedence over DO ratings, even to the extent of disrupting schedules and reducing your total output.

The DX is a "one use" rating. It can be used only to get the specific items listed when its use is authorized by the armed services.

DIRECTIVE · A directive is a written order from NPA to a particular company. It can tell you to produce or not produce a certain item; to deliver a quantity of a specified item to a named person within a given time. It can direct you to accept or reject certain priorities.

In effect, a directive is the ultimate priority. It takes precedence over everything else. There are no exceptions.

BASKET ORDER · Sometimes you may have a whole flock of DO orders, with a lot of different identifying numbers and symbols. You need material to fill these orders, but as individual orders they require less than minimum order quantities. You can combine all these orders into a single "basket order." Instead of itemizing all the different DO's you combined to make up the basket, you use the rating DO-Z8.

You can include DX orders in a DO basket. But only if you have enough DX orders to make up a basket all by themselves can you use DX-Z8.

"MINIMUM PRACTICABLE WORKING INVENTORY" · That's the largest inventory you're allowed to have of any material at any time. Obviously, it's tough to define. NPA Regulation 1 tries, but even after several pages of fine print this limitation is unenforceable except in most flagrant violations. That's why many "M" orders set inventory limits in terms of a specific number of days' supply, "or a minimum practicable working inventory, whichever is less."

END-USE RESTRICTION · Some "M" orders place limitations on the end products in which certain materials may be used, or on the *way* they may be used in end products.

Sometimes these restrictions take the form of prohibiting certain specified uses or products; other times, an "M" order will forbid all uses and products except those specified.

END-USE CERTIFICATE · To get some materials, you have to certify, in writing, to the supplier that your use of the material will be in compliance with the terms of the "M" order covering the material. Usually, a general statement to this effect is all that's needed. But sometimes you have to itemize the intended end uses.

ALLOCATION · An allocation is a specific authorization from NPA to transfer ownership of a certain amount of material. In most cases, an allocation is required by the supplier only; it is his authority to ship. But sometimes a prospective purchaser must obtain an allocation before he can place an order with a supplier. A fairly common arrangement is to put a material under allocation at the supplier level, and require the purchaser to submit an end-use certificate to the supplier.

TOLL AGREEMENT · This is an arrangement under which you supply a second party with material in one form (usually scrap or raw material) in return for an equivalent amount of the material in another form (usually finished or semi-finished). Most toll agreements are forbidden without prior written approval of NPA.

THE CONTROLLED MATERIALS PLAN

This is the over-all plan which governs the production, distribution, and use of steel, copper, and aluminum. The initials CMP are used loosely to refer to almost anything connected with the operation or administration of the Controlled Materials Plan.

"CONTROLLED MATERIALS" · These are the materials *directly* subject to CMP. They are mill shapes and forms of: carbon steel; alloy steels; stainless steel; copper and copper-base alloy brass-mill products; copper wire-mill products; copper and copper-base alloy foundry products and powder; aluminum.

The exact shapes and forms which constitute "controlled materials" are listed in Schedule 1 of CMP Regulation 1.

These controlled materials are obtained by Authorized Controlled Material Orders (ACM's—fuller explanation later). All other materials, and controlled materials fabricated beyond the shapes and forms listed are obtained by regular purchase orders (with a DO rating, if you're entitled to use it).

CLASS B PRODUCT · Any product that is listed in the "Official CMP Class B Product List." In general, B products are those which are made to stock, without a specific purchaser in mind. A minor change in specification at a customer's request does not take a product out of the B class. If the change is big enough so that you could no longer sell the item through your regular sales channels, the product ceases to be a B product.

CLASS A PRODUCT · Any product that requires controlled materials for its manufacture, and is not specifically listed as a Class B product, is a Class A product. In general, a Class A product is one made to special order.

Don't get confused on this point: *A Class A product can contain components which are Class B prod-*

More on next page

ucts. Similarly, a Class B product may require components which are Class A products.

PRODUCT CLASS CODE · These are the code numbers assigned to groups of Class B products in the Official CMP Class B List. Applications and allotments (see below) for all products in a given Product Class are considered as a unit.

APPLICATION FOR ALLOTMENT—CLASS B PRODUCTS · This is form CMP-4B. You make out a new one each quarter. You make out a separate application for each Product Class, if you want to manufacture any products within that class. You do *not* make out separate applications for two or more products within a given Product Class.

On your application, you state the amount of controlled materials required to make your B products and any Class A components of your B products. Do *not* include the controlled materials needed to make B product components (those materials will be covered by applications filed by the maker of the B component).

Send your CMP-4B to the industry division of NPA or claimant agency indicated in the Official CMP Class B Product List for the particular Product Class Code involved.

APPLICATION FOR ALLOTMENT—CLASS A PRODUCTS · This is Form CMP-4A. You make out a new one each quarter. Fill out a separate application for each A product you want to make, and for each purchaser for whom you are making it. (If enough purchasers order the same A product, you can make special application to NPA to have this A product treated as a B product.)

On your application, state the amount of controlled materials you need to make this A product, and to make any Class A components you must purchase. Do *not* include the controlled materials needed to make B components.

Send your CMP-4A to the claimant agency or the manufacturer who ordered the particular A product from you.

CLAIMANT AGENCY · It's the government body that "claims" allotments of controlled materials from the national pool. For B products, the claimants are the industry divisions of NPA. For A products, they are the armed services and other agencies that place prime contracts. The claimant takes its total allotment and divvies it up among the manufacturers who have filed applications for allotment.

ALLOTMENT · When your application for allotment is approved (either as a whole or in part), you get one of the carbon copies back. On this copy, you'll see indicated the amount of controlled materials allotted to you for making the particular product or products covered by the application.

You use your allotment in two ways:

1. To order controlled materials for direct delivery to your plant.

2. To "pass on" the controlled materials needed by the companies making A products for you.

Your total of orders outstanding plus the amounts you have passed on to makers of A products may never exceed your allotment.

Every allotment has a "time value." It's good only during an indicated 3-month period. If—for *any* reason—you can't get delivery of the materials allotted to you for the period, you're just plain out of luck. You don't have to cancel the particular order, but you do have to "charge" it against your allotment for the succeeding quarter. The result, of course, is that you will have to cancel or delay some other order scheduled for later delivery under your succeeding quarter's allotment. That's the only way you can keep your outstanding orders within the limits of your allotments valid for a particular quarter.

ADVANCE ALLOTMENT · On many items, you have to do business more than one quarter ahead. So you get "advance allotments" for successive quarters. You can place orders on the basis of these advance allotments, for delivery in the quarter indicated.

Most of the time, advance allotments are for smaller quantities than you can expect to get in your final allotment. But you have no assurance of this. Supply may fall off, or new military demands may arise. If your final allotment is less than your advance allotment, you must act immediately to cancel or delay delivery on enough orders to make up the difference.

"RETURN" OF ALLOTMENT · If you are allotted more materials than you need or are permitted to use for a particular purpose, you must "return" the excess allotment to the agency or manufacturer who gave you the allotment. (Cancellation or cutback of an order for A products is the most likely case where allotments must be returned.)

You don't return the material, if it has already been physically delivered. You keep it and charge it against your next allotment of that material.

ALLOTMENT SYMBOL · This is the numbering system that identifies your allotment as having been issued under a particular program, and the quarter for which it is valid. (Example: A-1-2Q52, for the second quarter of 1952.)

The program identification of your allotment symbol is used with a DO to obtain materials or parts other than controlled materials required to make the products for which the allotment was issued. (Example: DO-A-1.)

AUTHORIZED PRODUCTION SCHEDULE · It's a production schedule for which you have received an allotment of controlled materials. You are "au-

thorized to produce" up to the limit of the materials allotted, or up to the limits set in an applicable "M" order, whichever is *less.*

"ACM"—AUTHORIZED CONTROLLED MATERIAL ORDER • When you place an order for controlled materials on the basis of an allotment and an authorized production schedule, it's an ACM. You can get mill shapes and forms of steel, copper, and aluminum *only* with ACM orders.

SELF-ALLOTMENT • There are four main conditions under which you allot controlled materials to yourself, without the rigamarole of filling out forms, making applications, etc. These conditions are:

1. You are a small user. That is, you need less than the following amounts of controlled materials in a quarter to make all products within a given Product Class:

Carbon steel (including wrought iron)	5 tons
Alloy steel (except stainless)	½ ton
Stainless steel	None
Copper (all forms)	500 pounds
Aluminum	500 pounds

If your requirement for a given Product Class exceeds any *one* of the amounts listed, you must apply for your allotment of *all* the materials for that class.

Note that you may have to apply for allotments for some of your products and not for others.

The allotment symbol for small users is SU.

2. You need controlled materials as MRO. You can self-allot up to the quota limits of CMP Regulation 5 (see page W-11).

3. You need small amounts of controlled materials for construction. For certain types of construction, you can self-allot up to the limits specified in CMP Regulation 6. (See page W-13)

4. You need small amounts of controlled materials for laboratory or experimental purposes. You can use the materials you obtain in this way for investigation, testing, development, or experimentation. You can build experimental models, but only the minimum number and minimum size necessary to check the "suitability of the article for commerical production and use."

Trial production runs or pilot-line operations are forbidden without prior written approval of NPA.

Within these limitations you can self-allot up to the following amounts per quarter:

Carbon steel (including wrought iron)	5 tons
Alloy steel (except stainless)	½ ton
Stainless steel	300 pounds
Copper (all forms)	300 pounds
Aluminum	300 pounds

The self-allotment symbol for laboratory and experimental purposes is X-1. Orders must carry the additional statement: "Certified under NPA Order M-71."

The Controlled Materials—Steel, Copper, Aluminum

How Do You Get Them?

With one minor exception, you must have an allotment under the Controlled Materials Plan.

The exception involves aluminum: Distributors may sell up to 5% of their previous month's sales to persons who do not have any allotments, and who are not entitled to place ACM's for aluminum.

With an allotment, you can place ACM orders on either mills or distributors, but only up to the limit of your allotment. And it's still worth repeating that your allotment limits the total number of orders you can place, not merely the amount of material on which you can take delivery.

Don't get confused on this key point: ACM's are used only to get controlled materials. To get *products* made from those materials, use a regular purchase order (with a DO rating, if you're entitled to one).

When it comes to deciding whether to order controlled materials from mills or distributors, you have to watch out for both minimum mill quantities and maximum distributor orders.

• **Ordering from mills.** Even though it has open space on its order books, a mill can reject your ACM if it's for less than the "minimum mill quantity" for the particular type of controlled material shown in Schedule IV of CMP Regulation 1. (A mill can accept your order for a smaller quantity if it wants to, but it probably won't want to.)

The time for placing your mill orders will be more important than ever in 1952. After a lot of experimenting, NPA believes it now has a system that will eliminate most of the earlier problems.

The simple way to catch onto this system is to add 60 days to the lead times in Schedule III of CMP Regulation 1—the lead times you've been living with right along. The total (60 days plus lead time) tells you the day on which the mill must open its order books for a given month.

For example: You want hot-rolled sheets of carbon steel delivered in May. Lead time for this item is 45 days. Plus 60 days, brings you 105 days back from May 1, or to Jan. 15.

For 45 days from Jan. 15, the mill can accept or reject your ACM, as it chooses. The only exceptions are ACM's with allotment symbols A, B, C, or E. The mill is required to accept those.

During the following 15 days (Mar. 1 to Mar. 15 —the 15 days before the lead time deadline), the mill must accept all ACM's *in the order received,* up to the limit of its scheduled production.

More on next page

• **Ordering from distributors.** Distributors must accept ACM's against inventory on hand, but only up to the following limits for any one item within the period noted:

Steel (per week)	Maximum
Carbon	8000 pounds
Alloy	5000 pounds
Stainless sheet	2000 pounds
Stainless bars and plates	1000 pounds
Stainless tube or pipe	1000 pounds or 1000 feet

(Total not to exceed 40,000 pounds, unless 10 or more items are included, each subject to limitations above.)

Copper (per month)	Maximum
Brass mill products	2000 pounds
Wire, up to 4/0	500 pounds
Wire, over 4/0	One standard mill reel length

Aluminum (per month)	Maximum
Sheet, plate, foil	1000 pounds
Rolled rod, bar, wire	300 pounds
Structural shapes, extruded shapes, or tubing	300 pounds

Of course, there is nothing to stop a distributor accepting a larger order if he wants to. And, where a distributor has an established agency relationship with a mill, the distributor can accept your order to be filled directly from the mill.

• **Aluminum for destructive uses.** You use a special self-allotment procedure set up in order M-84. ("Destructive use" means any use from which aluminum cannot be recovered as a metal, such as alloying, steel deoxidizing, thermit, chemical reactions, etc.)

The order limits the grade and amount of aluminum you can use for each of 11 specific destructive uses. As long as you stay within those limits, you can self-allot by using the allotment symbol X7, plus a special "use identifying" number. (Example: X7-9, for chemical reactions.)

If you want aluminum for any destructive use other than the 11 specified, you must write to NPA for permission to use an allotment symbol.

How Can You Use Them?

You can use your controlled materials only to make the products you indicated on your CMP applications. You can't use more of a controlled material to make a particular product than was indicated on your approved application for that product.

There's one important exception, for makers of Class B products: You can use your material to make a different product than the one indicated on your application *if* the second product is listed in the same "group" as the first in Schedule 1 of Order M-46B.

For example: You were allotted 50 tons of steel for product X and 10 tons for product Y. You didn't even apply for material to make product Z. But you find that X, Y, and Z are in the same group in the schedule. You can use the entire 60 tons to make X or Y or Z, or divide it among them as you see fit. (You can also "shift" the copper and aluminum you were allotted for X and Y in the same fashion.)

The schedule of groups within which shifts are permitted has already been changed twice. *Keep your eye open for more changes.*

(Of course, if you have no allotment of aluminum, and get your supplies under the distributors' 5% exemption, these limitations don't apply.)

There are a couple of important things you can't do with your copper or aluminum. You can't use it for decorative or ornamental purposes. And you can't use a greater quantity or a higher grade in any product than is actually necessary for functional or operational purposes.

(For limitations on certain types of steel, see "steel alloys" and "special steels," below.)

What About Scrap?

The rules on scrap range from mild on steel to extra-tough on aluminum. But considering the tight situation in all types of scrap, it's surprising they haven't had more publicity.

There are special rules for scrap dealers and producers of controlled materials. Those below apply to "generators of scrap"—anyone who creates scrap in the course of fabrication or assembly, or through products or equipment becoming obsolete.

Steel • Only tool steel scrap is under control. If your tool steel scrap contains more than 5% total combined weight of tungsten, molybdenum, and cobalt, the scrap can only be used as remelt for tool steel.

Copper • You can't pile up copper scrap, or copper-clad or copper-base-alloy-clad steel to the tune of more than 2000 pounds (or 30 days, if that is longer).

Aluminum • You can't pile up aluminum scrap for more than 30 days in any event. If you get a "minimum carload" sooner than that, you must dispose of it.

And you are required to segregate your aluminum scrap by alloy. Exception: You're not required to segregate skimmings, drosses, grindings, buffings and sawings. Note that turnings and cut-offs are *not* excepted.

STEEL ALLOYS

To date, five steel alloys have been brought under complete allocation by NPA. They are: nickel, cobalt, tungsten, molybdenum, and columbium and tantalum. (The latter two are considered as a single item, and are under one of the tightest of all NPA controls.)

How Do You Get Them?

Except for very small quantities, which may be obtained by self-certification, you must apply to NPA and get a special allocation in order to buy any of these steel alloys. (For forms to use in applying, see orders M-80 and M-81.)

The following are the maximum quantities per month which may be obtained by self-certification:

Nickel	100 pounds
Cobalt	25 pounds
Tungsten	25 pounds
Molybdenum	200 pounds
Columbium and tantalum	10 pounds

How Can You Use Them?

In general, you can use these alloys wherever they are required for functional, operational, or legitimate protective purposes. The various schedules of M-80 go into great detail regarding prohibited uses of these alloys. Here are some:

Nickel • May not be used for decorative or ornamental purposes in any product. Banned in such tools as drills, planes, saws, wrenches, and nonfunctional parts of power tools.

Cobalt • Unless required by rated orders, cobalt content of magnet steels is limited to 20%; of cast magnets, to 30%.

Tungsten • Requires substitution of other materials (except those subject to M-80) wherever commercially feasible. Prohibits use of more than 50 pounds per quarter in grinding wheels, pigments, or as coloring or coating materials (printing inks excepted).

Molybdenum • Requires substitution of other materials (except those subject to M-80) wherever commercially feasible. In any event, limits moly content of stainless steel to 2.5 % by weight.

Columbium and tantalum • Flatly forbidden except in steels for Defense Department or AEC. Even military orders must be countersigned by the Aircraft Production Resources Board.

SPECIAL STEELS

There are some out-of-the-ordinary rules that apply to three special classes of steels:

Nickel steels • Schedule A of M-80 bans the use of nickel-bearing stainless or high-nickel alloy in most consumer products and in many products for industrial use. Use for decorative or ornamental purposes is completely outlawed. This same schedule covers nickel silver; its use is prohibited in any product except those specifically listed (in general, essential industrial products, plus tableware and musical instruments).

Tool steel and high-speed steel • Requires substitution of lower grades (Class A for Class B) wherever possible. Tungsten content must be held to minimum necessary for intended application. Limits Class B to 20% of total order. Provides small-user exemption of 300 pounds of Class B high-speed steel per quarter. Schedule B of M-80 lists several technical limitations on applications of high-speed steels. Prominent prohibitions: shanks of tipped or welded tools, hand tools. Exceptions: tool bits, tool steel used for hot work.

Aircraft quality alloys • Can be used only if required by specification for aircraft application, or if required by an Atomic Energy program using the allotment symbol E-2. All orders for aircraft quality alloys must be "certified under Schedule 1 to NPA Order M-6A."

Other Primary Metals — Tin, Lead, and Zinc

How Do You Get Them?

If you require pig tin, pig lead, or slab zinc, you must get an allocation from NPA. If you are a small user and have not applied to NPA for an allocation, you can self-allocate up to the following limits: pig tin, 3 short tons per month; pig lead, 5 short tons per month; slab zinc, 20 short tons per month.

If you need these materials in other forms, or as alloys, just place a regular purchase order. Use a DO rating if you're entitled to do so.

There's one important exception: In the case of tin, you must attach to your order a complete list of the intended uses of the tin being ordered, and certify that these uses are permitted by orders M-8 (tin) or M-24 (tin plate and terne plate). This applies to DO-rated as well as non-rated orders, unless the end use is an "implement of war" ordered by specification for delivery to the military services.

What Can You Do With Them?

Limitations on end uses and applications in manufacturing process range from very tight on tin to mild on zinc.

Tin • Tin can be used *only* for the purposes listed in the seven schedules attached to order M-8. In brass and bronze, solders, and babbitt, tin content is limited to a percentage by weight even in permitted uses. (The schedules cover three pages.)

You can't use tin in connection with certain end products, even if tin is permitted under the schedules. These are itemized in List A of M-8. They are mostly non-essential, such as toys, games, jewelry, fasteners, etc., or for galvanizing zinc.

In no event may tin be used for decorative or ornamental purposes.

There's one more broad prohibition: You can't use tin for any purpose you were not using it for

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on January 27, 1951. That includes greater percentage by weight or thicker coatings for a given use.

Your *total* use of *pig* tin is limited as follows: 90% of your base-period average for all uses except MRO; 100% of your base-period average for MRO.

It bears repeating: DO orders, except for implements of war, are included in all restrictions listed above.

Materials containing more than 1.5% tin are subject to the following inventory restrictions:

Pig tin for tin plating	120 days
Pig tin for other uses	60 days
Lead-base alloys	45 days*
All other alloys	60 days

*(*So says M-8—the tin order. M-38—the lead order—says 30 days for lead-base alloys. NPA tells us you should write the Tin-Lead-Zinc Division for an "administrative decision" in each individual case!)*

Tin plate and terne plate • New *or reconditioned* tin plate and terne plate can be used *only* for the purposes listed in the schedule attached to M-24. That schedule also limits the amount of tin or terne metal, in terms of pounds per base box, that may be used for particular applications.

If you use less than 100 base boxes a year of both tin plate and terne plate, you're exempt from the restrictions in the schedule. But you still can't use it to make any of the products in List A of M-8.

Lead • Your total use of lead and lead products (by weight of lead content) is limited to 100% of your average use during the base period.

You can't use lead in any form unless you were using it in that same form for the same purpose during the base period.

Lead used to fill DO-rated orders is exempt from the restrictions above. You're also exempt if you use less than five short tons per month.

Inventories of lead and lead products must be held to a maximum of 30 days' supply.

There are several special exemptions for printers and publishers.

Zinc • Use of special high-grade zinc (99.99% pure or better) is limited to 70% of base-period use. On all other zinc, you're limited to 80% of your base period use.

There are several exemptions from these limitations. Among them: zinc to fill DO-rated orders; zinc used to comply with government safety regulations; zinc for electroplating *where it replaces cadmium.*

Inventory of zinc is limited to 30 days' supply.

If your use of zinc comes to less than 3000 pounds per quarter, you're exempt from all limitations except the one on inventory.

Miscellaneous Metals

What Are the Rules?

Platinum, cadmium, and bismuth are under tight controls as tc end uses. Antimony is under inventory limitation only.

Platinum • The prohibited uses of platinum are listed in order M-54. In general, they're the nonessentials you'd expect: jewelry, tableware, lettering, optical frames, and personal effects like pencils, lighters, and toilet sets.

In no event may platinum be used for decorative or ornamental purposes. It's permitted in electroplating, but only if required for functional purposes.

Inventory is limited to 60 days' supply.

There's an interesting twist in the control on platinum scrap • If you have more than 30 days' accumulation of scrap on hand, you can't buy any additional supplies of new platinum. Seems as though it might be a good way to get scrap out of hiding.

Cadmium • This metal can be used only for the products and purposes specified in M-19. Even a DO rating doesn't call for an exception (it usually does). To get cadmium, you have to provide an end-use certificate, stating that you will use the cadmium only for the purposes permitted by M-19.

Inventories are limited to a 30-day supply, with a specific exemption if you run into trouble with minimum purchasable quantities.

Bismuth • Your total use is limited to 100% of your base-period use or 100 pounds per month, *whichever is greater.* And you can't use bismuth in any amount except for the purposes specifically listed in order M-48. When you order bismuth, you must not only certify that you will use it for purposes permitted by M-48, but you must itemize exactly what use you will make of it.

Producers and importers of bismuth are required to set aside 20% of production (or imports) for delivery only against special NPA directives.

Here's another unusual approach to the scrap problem • In figuring your inventory of bismuth, you must include any commercially recoverable scrap, such as discarded, broken, or obsolete tools, dies, or accessories. (Obsolete is defined as not used for six months.) After adding in your scrap, your inventory is limited to 45 days' supply. If you're over that limit, you're forbidden to place any orders for more bismuth.

Antimony • Your inventory is limited to 60 days' supply (scrap specifically excluded). But M-39 permits you to exceed that limit if you do so by buying antimony abroad and importing it. There's one condition: You may not then receive deliveries from domestic sources until your inventory of antimony is reduced to the 60-day level.

Other Materials

CHEMICALS

What's Regulated?

Chlorine and sulfur are the most widely used of the controlled chemicals. In addition, there are 10 chemicals brought under allocation by the schedules of M-45 (listed below). But we can't give you the complete list here. There are too many under the "omnibus" chemical order, M-32.

How Can You Get Them?

Chlorine · Use a DO rating if you're entitled to do so. Place your order with a producer at least 15 days before the first of the month in which you require delivery. When ordering from distributors, lead time is 20 days.

If you use chlorine for "public health purposes" —purifying drinking water, sewage treatment, etc. —your orders for up to 100% fo your 1950 consumption for this purpose are just as good (or better) than DO orders. M-31 requires your producer or distributor to ship this chlorine to you. Suppliers can reject DO orders in excess of 10% of their scheduled production.

Sulfur · This is under complete allocation *at the supplier level.* That is, you don't have to get an allocation from NPA to place an order, but the supplier has to get an allocation before he can ship you the sulfur you've ordered.

And catch this: A DO rating has no preference over a non-rated order (although NPA may consider DO ratings in making allocations to suppliers).

Chemicals under allocation · Order M-45 sets up the rules for handling chemicals under complete allocation. There are three different classes of material set up. Suppliers of any class of chemicals under this order must make application to NPA and receive authority to make delivery. Here's how the three classes work for users:

"Appendix A" chemicals · Users must get specific allocation before placing orders.

"Appendix B" chemicals · Users must certify to the supplier that the end use of the chemical is authorized by the appropriate M-45 schedule, and specify the end use in detail, except for "small order" quantities.

"Appendix C" chemicals · Users must supply an end-use certificate to get any amount, and must get specific allocation from NPA for quantities above limits specified in schedules.

Here are the 10 chemicals brought under the order so far, together with the monthly small-order exemption for each:

	Exemption
Appendix A	
Polytetrafluoroethylene	None
Resorcinol	None
Methylene chloride	550 pounds
Thiokol	None
Appendix B	
Naphthenic acid	55 gals.
Sulphuric acid	60 tons*
**(basis 100% sulphuric acid)*	
Plastic-type nylon	
Granular polymer	540 pounds
Level monofilament	25 pounds
Tapered monofilament	None
Polyethylene	500 pounds
Methyl chloride	90 pounds
Sebacic acid	None
Appendix C	
No schedules yet issued under this appendix.	

Miscellaneous chemicals · Use a DO rating if you're entitled to do so. Place your order with a producer 15 days in advance of the month in which you require delivery. (Exceptions: 20-day lead time for carbon tetrachloride; no lead time for barium carbonate, chrome yellow, chrome orange, or anthraquinone vat dyes.) When ordering from a distributor, there's no lead time except for carbon tetrachloride and perchlorethylene (20 days).

Don't be fooled by mention of methylene chloride in the latest (Aug. 20) version of M-32. NPA just hasn't gotten around to amending it. Methylene chloride is under complete allocation (Schedule 9 of order M-45).

What Can You Do With Them?

Chlorine · If you obtained your chlorine under a "public health" certification, you can use it only for that purpose. Otherwise, no limitations.

Sulfur · No end uses specifically prohibited. But your total use is limited to 100% of base period monthly average. Small user exemption: 20 short tons per month. Your inventory can't exceed one quarter's permitted use.

Chemicals under allocation · No end uses are specifically prohibited by the order. But you must specify intended end uses in detail on your allocation application, and NPA can disallow selectively, if it chooses. Your inventory can't exceed your requirements for one allocation period (one month in all schedules issued to date).

There's a special gimmick on sulphuric acid · Everybody must file application-for-allocation forms. But unless you do business in the Pacific Coast or Rocky Mountain states, you may assume automatic approval of your application.

Miscellaneous chemicals · Use 'em for what you want, in any quantity you can get. And no specific inventory limitation.

More on next page

TEXTILES

What's Controlled?

Rayon, carded cotton sales yarn, and cotton duck are subject to mild delivery limitations. There's a *minimum production* requirement on cotton duck.

What Can You Do?

Rayon · You have to give a producer 30 days' lead time on your order. He can reject your DO rating if he's already booked 30% of his production on DO's.

Carded cotton sales yarn · The lead time is 15 days. A producer can reject your DO if it's for yarn of a specification he does not normally put up—and it would cause "lack of balance" in mill production. DO orders can also be rejected above the following percentages of scheduled production: coarser than sixes, 20%; sixes to twenty-two's inclusive, 30%; finer than twenty-two's, 20%.

Cotton duck · DO orders can be rejected above 80% of scheduled production. But here's the real stinger in M-53, the cotton duck order:

Any loom used to make cotton duck during the week of January 14, 1951, must be continued in the production of cotton duck, and it must be operated at least as many hours each week as during the base week. The only exceptions are for looms making single- or double-filling flat duck.

WOOD PRODUCTS

What Are the Rules?

The items you need bother about are chemical wood pulp, softwood plywood, and parer.

Chemical wood pulp · Use for manufacture of paper is limited to 95% of base period. But there's an unusual exception: If you fall below 95% in any quarter, you are permitted to "carry over" the difference between 95% and actual use into the suceeding quarter, to maintain an average of 95%.

Inventories are limited to a 45-day supply. Exception: nitrating grades for ordnance purposes. There's also a special formula to provide a seasonally varying inventory limit for companies dependent on foreign markets.

Producers are required to set aside 3% of their production and offer it for sale to users of market chemical wood pulp. (DO-rated orders cannot be used to obtain wood pulp.)

Softwood plywood · There's a 30-day lead time for DO-rated orders. Manufacturers are required to set aside 30% of their production for delivery against DO orders, but can reject rated orders in excess of the set-aside.

There are a couple of special requirements that apply only to makers of Douglas fir plywood:

If you make both interior and exterior types, at least 50% of the set-aside must be exterior types.

If you make interior types only, at least 40% of the set-aside must be suitable for concrete forms.

Paper · Manufacturers are required to reserve a percentage of production (varies from 5% to 25%, depending on type of paper) for DO-rated orders and direct orders from certain government agencies (even though not rated). Under terms of the paper order (M-36) NPA can direct a manufacturer to produce an amount of paper of a given grade at least equal to his reserve percentage applied to his "most recent calendar quarter."

ANIMAL PRODUCTS

What's Controlled?

Skins and hides of most animals have been brought under one of three types of control. (Vegetable tanning material, including non-leather uses, is regulated in a "companion" order.) In addition, NPA has put controls on pigs' and hogs' bristles and waterfowl feathers.

What Can You Do?

Leather · You have to allow 30 days' lead time on orders for tanned or finished leather. Producers can reject DO-rated orders above the following percentages of their scheduled production of types of leather, subject to order M-28:

Calf, including whole kip	20%
Goat and kid	10%
Bag, case, strap, and harness	20%
Sheep and lamb, excluding shearlings	15%
Shearlings	25%
Cabretta, other than shoe	20%

All former restrictions on sole leather have now been removed.

Cattlehides, calfskins, and kips (raw hides and skins only) · These hides are brought under complete allocation by NPA order M-35. If you need more than 100 in any month, you must get an allocation from NPA. Contractors, converters, and tanners are limited to the same proportion of the total market they held in 1950.

DO ratings cannot be "extended" to obtain these hides and skins.

Cutting off bellies or shoulders of untanned hides is forbidden except on written authorization by NPA.

Hides and skins (except cattlehides, calfskins, and kips) · The number of hides and skins that may be put into process is limited to a percentage of base period. (It's 135% for fourth quarter, 1951; watch for an amendment to this order covering future quarters.) The ratio of raw, semi-tanned,

and pickled skins put into process must be the same as in the base period.

Vegetable tanning materials. · Use of these materials is limited to the following purposes: tanning; making pharmaceuticals; making tannic, gallic, or pyrogallic acid, or water-treatment products; drilling gas or oil wells, or making a product for that purpose.

Use of chestnut oil in a blend is limited to the proportion used in blends during the base period.

Use of quebracho oil for drilling gas and oil wells is limited to 60% of the amount used for that purpose during the base period.

Pigs' and hogs' bristles · Length of bristles you can use in brushes, other than for export or for DO-rated orders, is limited to 2⅞ inches.

Where longer lengths are required, at least 30% filling material other than bristles (by weight) must be used.

Use of Chinese bristles above 2⅞ inches and other bristles above 4⅛ inches is limited to the types of brushes described in the schedule attached to order M-18. Width, thickness, and depth of brush ferrule is limited, according to intended application.

Waterfowl feathers · You can't use waterfowl feathers except to fill DO-rated orders. And order M-56 specifically forbids the use of DO-MRO—the rating used to get MRO—to obtain waterfowl feathers.

Supplies and Equipment

MRO — MAINTENANCE, REPAIR, OPERATING SUPPLIES

What IS MRO?

It's maintenance, repair, and operating supplies. Under some conditions, it may include minor capital additions (maximum cost of a minor capital addition, excluding purchaser's labor, is $750).

How Do You Get MRO?

If you need controlled materials as MRO, you have to use the allotment symbol MRO to convert your purchase orders to ACM's.

If you need other materials or products as MRO, you may use the rating DO-MRO. You're not required to use this rating. You may be better off to compete in the "open market," because of restrictions placed on the amount of MRO you can buy if you use a DO.

How Much MRO Can You Get?

If you buy it all on the open market, the sky's the limit. There's not much chance you'll want to do that under today's conditions, so you start by figuring your quota.

Your quarterly quota is 30% of the dollar amount you spent for MRO in calendar 1950 (you can use your last fiscal year prior to March 1, 1951, if you prefer). You do *not* include money spent for minor capital additions, or for materials not subject to NPA control, such as gas, oil, coal, electric power, etc. (The complete list of non-NPA-controlled items is printed in NPA Regulation 2.) You *do* include money spent for items in Schedule 1 of CMP Regulation 5 (such as chemicals, packages, paint, etc.), even though you cannot use a DO-MRO to obtain such items.

You can use priority assistance (DO-MRO and the allotment symbol MRO) up to the limit of your quota, and no questions asked—except that you keep records of the transactions. You can include minor capital additions up to 10% of your quarterly quota, or $750, whichever is greater.

If you use priority assistance for more than 20% of your quota, your total purchases of MRO (rated or not) are limited by your quota.

Many folks figure the smart thing is to keep their use of priorities below 20% of quota (obviously, this must include *all* purchases of controlled materials). Then they go into the open market for whatever else they need. In this case, there's no limit on the amount you can buy without priorities.

CONTAINERS

What's Controlled?

Many companies consider containers to be operating supplies—part of their MRO. However, under NPA regulations, containers are specifically *excluded* from the category of MRO. You can *not* use a DO-MRO to get containers.

NPA has issued regulations covering the following items that come within the broad classification of "containers": cans, packaging closures, collapsible tubes, glass containers, steel drums, strapping, and binder and baler twine.

What Can You Do?

Some containers can be used only for specified purposes; on others, there's a total quantity or "percentage of base period" limitation on use or production. And a few have special inventory limits.

Cans · If you use cans, all we can tell you is to consult order M-25. You'll find an 8-page-long table listing the amount of cans you can use, and the maximum tin content—all depending on what you plan to put in the cans.

Can makers are not limited as to quantity, but must keep specifications within the end-use limitation. (That is, not use more tin than permitted in a can intended for a particular end use.)

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Steel shipping drums • You can use them *only* to pack products you were packing in them during the year ended June 30, 1951. And you can't use a steel drum to pack any commodity listed in order M-75, even though you were doing so before June 30, 1951. (Most of the items listed are those which common sense would tell you can be packed just as well in other containers.)

Your quarterly purchases of new drums are limited to 22.5% of your total purchases during 1950 (with adjustment provided for seasonal users). Your inventory of drums (including those capable of being reconditioned for use) is limited to a 45-day supply.

Strapping • You can use strapping only for the purposes listed in M-59. Here are the five "general" applications permitted:

1. Weight of container and contents over 90 pounds.
2. Contents weighs over 0.058 pounds per cubic inch.
3. Strapping required by Interstate Commerce Commission or Consolidated Freight Classification.
4. Shipment for export (not Canada).
5. To fasten material to skids or pallets.

Even if you miss out on those uses, there are nine classifications of commodities on which you may use strapping.

Your inventory of strapping is limited to a 45-day supply (in no case less than 1000 pounds).

Collapsible tubes • Tin content (percentage by weight) is limited by Schedule A of order M-27. It all depends on the intended use. In general: cosmetic and shaving cream, 3%; dental cream, 5%, medical jellies and ointments, 12½%; other medical preparations and food for human use, unlimited.

Tubes for all other uses are limited to 1.5% residual tin.

Your total use of aluminum in tubes is limited to 90% of your average monthly use for this purpose in the period August through November 1950. (Watch that base period; it's entirely different than in most orders.) Tin content is limited by intended end use.

Packaging closures (tin plate) • Maximum amount of tin plate permitted in closures depends on application. For food in hermetically sealed containers (except beverages), it's 1.50 pounds per base box. For kitchen supplies such as spices, olives, vinegar, etc., it's 0.75. Beverages are limited to 0.25. Everything else is 0.50.

No limit on *number* of tin plate closures you can make or use.

Packaging closures (aluminum) • Works just opposite from tin plate closures. *Number* you can use is limited to 65% of 1950 usage. Exceptions: Food and most drugs are 100%; usage for fluid milk and some types of drugs is unlimited.

There is one limitation on the *amount* of material: You can't use more than 65% of the aluminum you used in the base period to make liners for packaging and other closures.

Binder and baler twine • The only limit is on inventory: a maximum of 60 days' supply. If you're in a seasonal business, you can go above in proportion to your usual inventory pattern.

Glass containers • The only styles you can make are the ones you were making on March 31, 1951, or the 42 "simplified" containers illustrated in Schedule 1 of order M-51. No limits on usage.

PRODUCTION EQUIPMENT

Production equipment, as now defined by NPA is any non-portable metalworking machine that costs $350 or more.

How Do You Get It?

The most important thing to remember is that you can *not* get production equipment by extending a DO or DX rating.

You may, however, be able to get a DO rating applied directly to your purchase order for an item of production equipment. . . .

. . . If you're working on a government contract (or sub-contract). You fill out form NPAF-2, get it countersigned by the military representative in charge of the contract, and send it to the General Industrial Equipment Division of NPA. In general, the requirements for a DO are that you need the equipment to meet delivery schedules under the contract; that you don't have the equipment available in your plant; and that you can't get it without a DO in time to meet schedules.

. . . If you're making Class B products. Fill out forms NPAF-138 and 138A. To be eligible, you must meet one of these two requirements:

1. Your authorized production schedule for which you have received an allotment permits you to produce more than you produced in the first quarter of 1951.
2. You need the item as a replacement in kind of a machine that is no longer usable, and you can't meet your authorized schedules without the replacement.

There are some inconsistencies in M-41 and M-41A, covering scheduling and deliveries of metalworking machines. They make it look as though it might not be too difficult to get delivery of production equipment without DO ratings. You can expect these points to be cleared up. We're told the situation will add up like this:

For all practical purposes, you won't be able to get production equipment without a DO rating. At the same time, DO's will be easier to get than in the past.

Construction

What Can You Build?

The only construction prohibited *by type* is structures for recreational, entertainment, or amusement purposes. (The specific list is in Table 1 of M-4A.)

Manufacturing companies are not likely to run afoul of these restrictions except where recreational facilities are included as part of a new plant. Such cases are considered individually when you apply for materials.

There are some very tight restrictions on how you may use copper or aluminum in construction. You'll find the complete list of prohibited uses in M-4A. Among the broad prohibitions are these: decorative or ornamental purposes; cornices; downspouts; gutters; leaders; siding; roofing; most pipe in iron pipe sizes.

How Do You Get Materials?

How you get your materials depends on the amount you need.

You can self-allot if you need less than the following amounts of controlled materials:

Carbon and alloy steel*.....25 tons
*(*May include structural, but not more than 2½ tons of alloy steel, and no stainless.)*
Copper (all forms).....2000 pounds
Aluminum .....1000 pounds

You use the allotment symbol U-6. And you can get products and other materials that you require by using a DO-U-6. (You can't use the DO-U-6 to get construction machinery or metalworking machines.)

If you need larger quantities, you must file an application on Form CMP-4C. You send it to the Industrial Expansion Division of NPA.

Then you cross your fingers and hope. That's because the supply of structural shapes is only about 30% to 40% of current demand. So construction applications are being denied right and left.

You may not proceed with construction unless and until you receive an approved application and an allotment symbol. Then you can use that allotment symbol to get your controlled materials just as though they were materials for production. You can also use a DO in combination with the allotment symbol to get products and other materials you need for the project.

There are special rules for construction that apply only to the petroleum and gas industry. They are contained in M-46B.

What About Homes?

If you're thinking of building a home, you'll be interested in the restrictions on the materials you can use. Limits for single-family dwellings:

If you use steel pipe for the water system—1800 pounds of carbon steel and 35 pounds of copper.

If you use copper pipe for the water system—1450 pounds of carbon steel and 160 pounds of copper.

In neither case can you use any structural shapes, any alloy or stainless steel, or any aluminum.

Assuming you meet these conditions, you (or your contractor) can self-allot the controlled materials using the symbol U-7. And you can use DO-U-7 to get the other materials and products you will need.

Miscellaneous Controls

Rubber · It's hardly fair to call a 15-page order "miscellaneous." Especially when 11 of those 15 pages are given over to fine-print tables listing special restrictions (including percentage of natural rubber content) for specific products.

In general, consumption of new rubber is limited to 100% of base period. For tires and a batch of non-essentials specified in Appendix B of M-2 (like toys, bathing caps, etc.), it is limited to 90% of base-period use for the same purposes. There's no limit on use of natural rubber latex.

Rubber used to fill rated orders with certain program identifications (primarily military) is exempt from the limitations on use. There are additional exemptions for companies using less than 150,000 pounds of rubber per quarter.

All natural rubber is now imported by the General Services Administration. To obtain any from GSA, you must certify that its use will conform with the provisions of M-2, and that your inventory does not exceed 60 days' supply.

Synthetic rubber is allocated by NPA. Inventory is limited to a 30-day supply.

Artificial graphite and carbon electrodes · These electrodes are brought under complete allocation by M-66. Both purchaser and supplier must get an allocation from NPA before an order can be placed or delivery made.

There are two exceptions: The allocation procedure does not apply in the case of graphite electrodes of less than ¾-in. cross section. And you can "self-allocate" by certifying to the supplier that your *total* use of artificial graphite and carbon electrodes is less than 500 pounds per quarter from all sources.

Printing plates · M-65 prohibits keeping printing plates longer than the following periods from the date of last use: newspaper, 1 year; magazine and periodical, 1 year; book, 4 years; container, 1 year; all other types of plates, 2½ years.

The limitations apply to industrial companies

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which make or hold their own plates (for catalogs, employee magazines, stockholder reports, etc.), as well as to regular printers and publishers.

Any person holding plates beyond these limits may not order any new plates, or metal for making new plates. Anyone ordering such new plates or metal must certify that he has complied with M-65.

Jacks · Forbids production of mechanical, hydraulic, air, or electrically operated jacks unless they conform with the "standardized" specifications in the schedules of M-83.

Electrical components and parts · Order M-17 permits manufacturers to reject DO-rated orders in excess of the following percentages of production: electrical ceramic products—pressed steatite, 15%, extruded steatite, 20%, machined steatite, 20%; electron tubes (except power tubes)—produced by only one company, 50%, produced by more than one company, 25%; fixed composition resistors, 25%; and rigid electrical conduit, 25%.

Passenger cars · Order M-68 affects only the 11 passenger-car manufacturers named in schedule A of the order. The schedule establishes the percentage of the total materials available to the automotive industry to be allotted to each. The order also specifies the percentage of cars (by price range) that may be equipped with automatic transmissions.

Insect wire screening · Order M-42 establishes a 15-day lead time for rated orders. It also permits manufacturers to reject rated orders in excess of 10% of scheduled production.

Construction machinery · Order M-43 establishes a 45-day lead time for rated orders. It also permits manufacturers to reject rated orders in excess of 50% of average monthly shipments of each type during base period (January through June, 1950).

Power and electrical equipment · M-44 applies only to manufacturers of the types of heavy-duty equipment listed in the order, such as generators, circuit breakers, switchgear, turbines, transformers, etc.

Every manufacturer of such equipment is required to file detailed production schedules monthly. NPA may order changes in the schedules, and may allocate purchase orders among the various manufacturers of such equipment.

CHECK LIST OF NPA REGULATIONS AND ORDERS (as of Nov. 15, 1951)

NPA "M" ORDERS

1. Iron and steel (general)
2. Rubber
3. Revoked
4A. Construction
5. Aluminum
6A. Steel (distributors)
7. Revoked
8. Tin
9. Zinc (distribution)
10. Revoked
11. Copper (general)
12. Revoked
13. Rayon
14. Revoked
15. Zinc (use)
16. Copper (raw materials)
17. Components or parts
18. Pigs' and hogs' bristles
19. Cadmium
20. Iron and steel (scrap)
21. Revoked
22. Aluminum (scrap)
23. Carded cotton sales yarn
24. Tin and terne plate
25. Cans
26. Packaging closures
27. Collapsible tubes
28. Leather
29. Revoked
30. Revoked
31. Chlorine
32. Chemicals (rated orders)
33. Revoked
34. Revoked
35. Hides (cattle, calf)
36. Paper (government orders)
37. Zinc (scrap)
38. Lead
39. Antimony
40. Revoked
41. Metalworking machines
41A. Metalworking machines (for B producers)
42. Insect wire screening
43. Construction machinery
44. Power equipment
45. Chemicals (allocation)
46. Petroleum, gas (general)
46A. Petroleum, gas (foreign)
46B. Petroleum, gas (construction)
47A. Consumer durables
47B. Consumer durables
48. Bismuth
49. Revoked
50. Electric utilities
51. Glass containers
52. Revoked
53. Cotton duck
54. Platinum
55A. Revoked
56. Waterfowl feathers
57. Vegetable tanning material
58. Binder and baler twine
59. Strapping
60. Revoked
61. Revoked
62. Hides and skins (except cattle and calf)
63. Softwood plywood
64. Used rails, axles, wheels
65. Printing plates
66. Electrodes
67. Aluminum foil
68. Passenger cars
69. Sulfur
70. Marine MRO
71. Laboratories
72. Chemical wood pulp
73. Railroad MRO
74. Copper (for construction)
75. Steel shipping drums
76. Lead (distribution)
77. Communications
78. Mining MRO
79. Export MRO
80. Iron and steel (alloys)
81. Pure tungsten, molybdenum
82. Brass (distribution)
83. Jacks
84. Aluminum (destructive use)
85. Emergency radio
86. Copper wire (distribution)
87. Solid fuels MRO
88. Aluminum (distribution)

NPA Regulations

1. Inventories
2. Priorities (general)
3. Priorities (U.S.—Canada)
4. Revoked
5. Appeals
6. Transfer of businesses

CMP Regulations

1. Basic rules (general)
2. Inventories
3. Basic rules (deliveries)
4. Distributors
5. MRO
6. Construction
7. Repairmen

LOOKING AHEAD IN LABOR

Last-minute round-up as we go to press

What do the steel wage negotiations mean to you? Let's take a look.

• Policy: The steel settlement will need government approval. That means government backing—and wage-policy twists you may have to follow.

• Productivity: A plan for approving higher wages to compensate for increased productivity is the most likely new wage policy to come out of the steel case. Right now, General Motors and others with "annual improvement" clauses pay four cents a year. Murray wants it for steel, too.

• Wages: Higher steel wages not only will raise the cost of what you buy, but also add pressure for higher wages for your own employees.

• Guaranteed annual wage: This is the Big One the unions are after. The government ducked this demand in steel in World War II. This time, it could put steam behind the union drive by giving support. Remember how pensions spread in 1949 after the steel fact-finding recommendations.

• Union shop: Since the war, most CIO unions have been content with maintenance of membership as their brand of union security. Now Murray wants a union shop in steel. If he gets it, you will be hard put to avoid the same.

Murray has other demands, too. More than a score. As usual, however, many are tossed in strictly as trading material. The question is: What will Murray strike for?

The answer: Only if he doesn't get enough more in the worker's pay envelope — about 15 cents an hour. For that, he would give up annual wage, union shop, other demands. We think he'll get it.

•

Jurisdictional rights of CIO unions often overlap, resulting in bitter organization rivalry between two CIO unions. CIO hopes to end conflict by arbitration plan adopted by CIO convention.

If it works, only one CIO union will try to sign up your employees. CIO's chemical union, hurt by others, forced a showdown. Actually, the plan is aimed mostly at ending squabbles among the CIO's Big Three — auto, steel, and electrical unions.

• CIO's unionization of white-collar workers is beginning to be felt. As more join up, you will see more of this sort of thing: salaried engineers striking Briggs in Detroit; aircraft engineers at Wright Aeronautical taking dispute to WSB. UAW-CIO represents both groups.

Secretary of Labor Tobin is a big help. He is goading both AFL and CIO organizers—says white-collar workers need unions to keep earnings up.

•

Truman is being pressured again to set up a Fair Employment Practices Commission by executive order. Chances of FEPC legislation are dead. Urging is by CIO and new Communist-inspired National Negro Labor Council.

•

Watch for the "political angle" in many of the moves the government and labor unions make until next November's presidential election. They will be inspired by politics as much as economics.

• In the stabilization agencies, for instance, you can depend on Truman's administrators not to alienate labor support if possible. Wages will be as loose—prices as tight—as the law permits.

• In organized labor, leaders will spend more time on politics. They will take public positions for and against candidates. Dollars will be sought from workers in the shops. Management will be attacked — often, only for political effect.

Already AFL and CIO political machines have started working on Congress now that local elections are out of the way. Voting records of every member on a dozen issues have been published. Taft-Hartley repeal is only one of them.

AFL hopes its success in recent city elections bodes victory next year. It claims a share in election of Halley (New York), Clark (Philadelphia), Robinson (San Francisco), Cronin (Hartford). The Hartford mayor is New England business representative of the Machinists Union.

CIO will concentrate its political muscle in 100 "marginal" districts and states where the incumbent won by less than 5% of the vote. A switch of only 3% could make the difference.

SEE PRACTICAL LABOR RELATIONS, PAGE 200

LOOKING AHEAD IN BUSINESS

Last-minute round-up as we go to press

This summer, civilian employment reached an all-time high of 62.6-million. Unemployment is down to 1.6 million, close to a practical peacetime minimum, and lowest since 1946.

In the face of this situation, defense industries are trying to round up 2-million workers this winter. And Defense Mobilization Director Charles E. Wilson estimates that an additional 2.5-million will be needed during 1952.

But there's a much smaller figure — 59,000 — that poses a much greater threat to meeting the schedule of peak defense output in early 1953.

In early November, there were 59,000 unfilled jobs as engineers, machinists, tool and die makers, and highly skilled metalworking machine operators. The number of unfilled jobs of this critically important type will increase, according to government estimates.

One indication of the scarcity of engineers: One major defense plant is offering salaries of $7000 and more for qualified — but inexperienced — engineers. And it still can't get enough.

•

Engineers and skilled workers are the only widespread shortages to date. A general shortage of labor has not materialized. Despite the gloomy statistics, it probably won't. At least not enough to hurt the defense program seriously.

•

But there are some sharp general local shortages, too. And they will stay with us. So far, the squeeze has hit only six of the 174 labor market areas. Four of the six — Hartford, Indianapolis, Wichita, and San Diego — blame their woes on fast expansion of the aircraft industry. Shipyards also have hurt San Diego. In the other shortage areas: A machine tool plant in the Moline-Rock Island-Davenport area is combing the entire Midwest for skilled men. Augusta-Aiken (Ga.) has turned itself inside out looking for manpower to work on the big atomic energy plant there.

As the defense program swings from the construction to the actual production phase, other local shortages of manpower will come into the picture to nag America's mobilization effort.

There are two favorable factors at work on the manpower shortage: Workers are being freed by cutbacks in civilian production; new workers are still coming into the labor force at the rate of about a million a year.

Cutbacks in civilian production are expected to yield 1.5-million additional workers for defense plants by the end of 1952.

The movement has already started. Layoffs of factory workers in September were at a rate of 13 per 1000. That's above the post-war average, for the third consecutive month.

Hardest hit, of course, were consumer goods industries affected not only by cutback orders but also by reduced sales and slow-moving inventories. Furniture, textile, apparel, and leather goods industries laid off men in September at a record post-war rate.

But the continued low unemployment indicates that laid-off workers are either being recalled or finding new employment with little time loss.

•

The so-called "normal growth" of the labor force is being increased by women and older workers.

There are about 650,000 more women in the labor force than a year ago at this time. Total number of women at work is pressing hard on the World War II record of 19-million. If the trend continues, next year will see the record fall.

We also have 343,000 more workers aged 45 and over in the labor force than a year ago. Lots of them are men coming out of retirement.

•

The cost of living index gives you a key to the influx of women and older workers. It has risen 13% in a year and a half. And despite the recent leveling off, prospects are that it will rise another 3% or so in early 1952.

That puts a real pinch on some families, where the breadwinner's pay has not kept up. Momma is being lured by attractive wages. Pensioners on fixed incomes are particularly hard hit — so they're coming out of retirement.

Talk about belt life – look at this one!

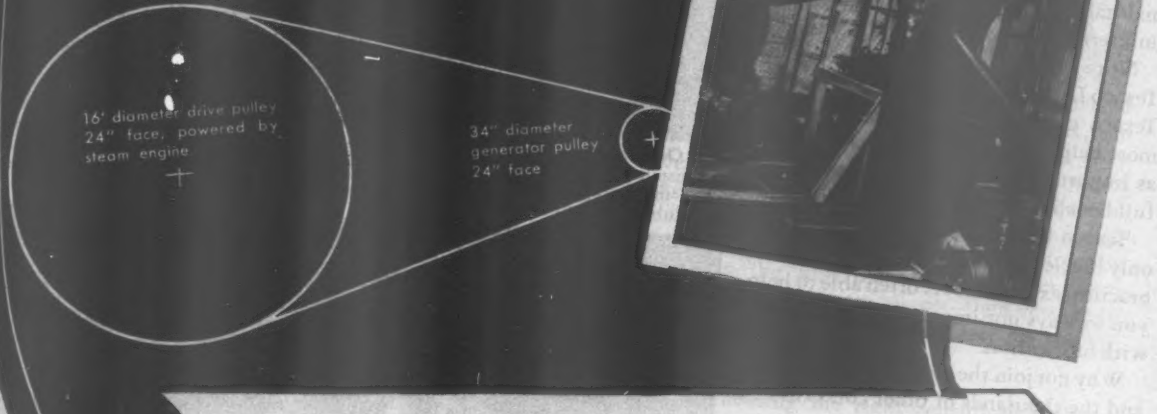
Originally installed in lumber mill powerhouse as recommended by the G.T.M.– Goodyear Technical Man – in 1924. } *Ran for 11 years.*

Damaged by fire in 1935, this Goodyear belt was cut down to 20" width from its original 34", and reduced from 9 ply to 7 ply. } *Ran for 13 more years.*

Today, inspection indicates this belt has more useful service even after lying idle for 2 years in a closed plant. } *ULTIMATE SERVICE ? YEARS.*

GOODYEAR INDUSTRIAL RUBBER PRODUCTS

GTM-Specified TRANSMISSION BELT for LUMBER MILL



FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING, RUBBER-COVERED ROLLS built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

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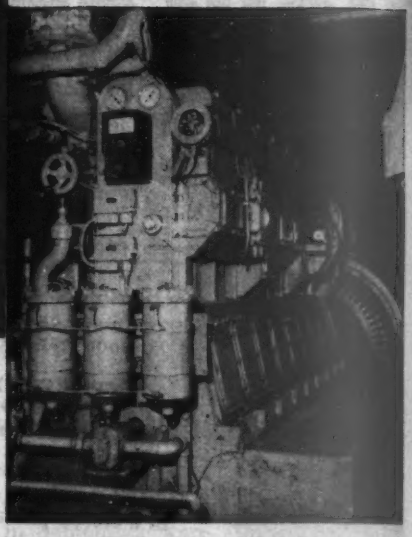
GOODYEAR

THE GREATEST NAME IN RUBBER

"YOU'VE HELPED US KEEP OUTPUT UP AND COSTS DOWN, FOR 37 YEARS"

...writes Kelly Plow Company



THIS Cooper-Bessemer Diesel has been working for Kelly Plow Company since 1944 and is virtually as clean today as when it went into service. Rings are still free, assuring the proper compression and combustion that mean low fuel consumption. Bearings are in perfect condition and wear of pistons and liners has been negligible.

"We have been using Texaco Lubricants in our plant here at Longview, Texas, since 1914. Combined with your excellent Texaco Lubrication Engineering Service, they have been a big help in maintaining high operating efficiency, uninterrupted production and low costs."

Note particularly the reference to Texaco Lubrication Engineering Service. Texaco customers everywhere find this most helpful. Proper application is just as important as high quality in getting full benefit from the lubricants you buy.

Texaco Lubrication Engineers are not only lubrication experts, but men of wide practical experience . . . often able to help you in ways not immediately concerned with lubrication.

Why not join the Kelly Plow Company and the thousands of other concerns . . . in all fields of industry . . . who rely on Texaco for trouble-free, cost-saving performance of machinery throughout their plants? Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THE OLDER of their two steam engines was installed by Kelly Plow Company in 1919, the younger in 1921. Both have been lubricated with Texaco steam cylinder oils from the day they went into service. Maintenance has been a very minor factor and bearings are still in like-new condition.

SINCE 1914 this Curtis Air Compressor has been lubricated with Texaco. Like all Texaco-lubricated machines in Kelly Plow Company's plant, it has given efficient, trouble-free performance throughout its 37 years of service.

TEXACO

TEXACO Lubricants, Fuels and Lubrication Engineering Service

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA broadcasts every Saturday afternoon.

If You Don't Want Any Consultants Around...

. . . then perhaps you're making a mistake that's not good for your company or you personally.

We've found in talking to plant operating men that a lot of them are wary about having industrial consultants help them with their problems. Sometimes this feeling stems from a sour experience with a particular consultant—there's a minority of them who fall into the class of "high pressure artists," or who lack the judgment not to tackle specialized problems they're not equipped to handle. But if one electric motor goes bad, you don't stop buying motors. It's the same with consultants.

Then you have some plant executives who feel that calling in a consultant is a reflection on their own abilities. Or they're afraid that consultants will saddle them with a lot of "fancy" systems and methods that will do more harm than good.

Of course, not all plant executives feel that way. Not by a long ways. But we're surprised at the number who do.

Take the matter of pride: Is it really a reflection on your ability if you get help from a consultant?

Not to our way of thinking. We don't believe it is an admission of weakness at all if you go to the financial managers of your company and ask to have expert, outside advice and help on special problems—or over-all problems—of your department. Fact is, we think just the opposite is true. If you welcome special help—and take the initiative in asking for it—we feel you've raised yourself in the eyes of upper management. You've demonstrated a couple of important things: (1) You earnestly want your department to do a better job; (2) you don't think you know it all.

There's an excellent example of this attitude in this issue of FACTORY. You'll find it in the article, "Ten Key Steps You Can Take for Better Maintenance Service," starting on page 112. The author is frank—and even proud—to state that a consulting firm helped his department make the many fundamental improvements that he reports.

We don't mean for one minute that you should turn the management of your department over to a consultant.

To use a consultant properly, you use him for consultation—to diagnose, study, and recommend. Then it's your responsibility to accept what you believe will work in your own shop, and to decide *whether, how,* and *when* you should put the recommendations into effect. After that you may well want the consultant's help in carrying out the suggested improvements, if they are specialized and time-taking. But the *decision* should be yours.

If you have taken the initiative in getting the consultant in the first place—rather than have had him forced on you from above—then you are in a far better position to accept or reject his recommendations.

The job of choosing the right consultant isn't an easy one, we know.

That difficulty, as much as pride, no doubt lies behind the attitude toward consultants reported elsewhere in this issue (Letters to the Editor Department, page 296).

The many consulting firms could do a far better job than they do of making known their special skills and capabilities.

But the difficulties of finding a good source for the advice you need are not insurmountable—any more than the difficulties of finding special tools and equipment to help boost productivity.

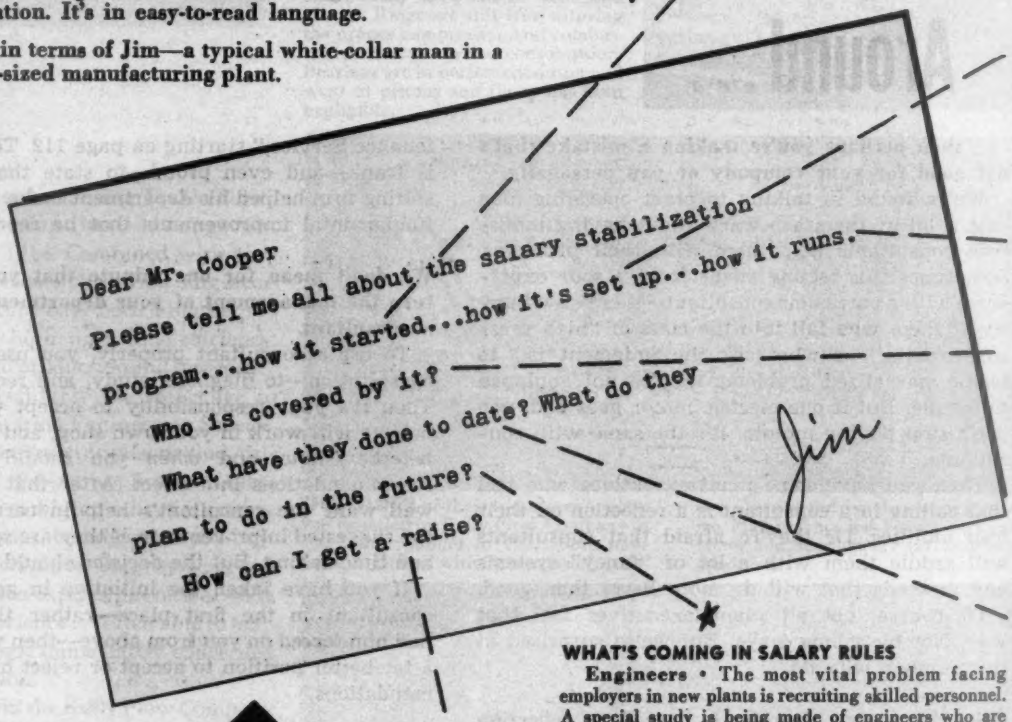
After all, it's your job to find better machines and equipment, and to ask for them—even to insist on getting them. The same goes for specialized advice in management.

What the Changing Salary Rules Mean to You...

...as a salary earner and as a salary payer

In the last few weeks there have been a lot of revisions in stabilization regulations. Here is an up-to-the-minute, authoritative explanation by Joseph D. Cooper, the executive director of the Office of Salary Stabilization. It's in easy-to-read language.

It's told in terms of Jim—a typical white-collar man in a medium-sized manufacturing plant.


Dear Mr. Cooper
Please tell me all about the salary stabilization program...how it started...how it's set up...how it runs.
Who is covered by it?
What have they done to date? What do they plan to do in the future?
How can I get a raise?
Jim

• MY MAIL IS ALWAYS HEAVY, probably 100 letters a day, many of them bulky, containing petitions for increases in salary under the stabilization program.

There are penny postcards, of soon-to-be-forgotten memory, too. It is these which often fascinate me. One of these I received recently asked for so much in so few words.

The card was signed merely "Jim." There was no address.

My guess is that Jim is a white-collar worker in a medium-sized manufacturing plant.

There must be thousands like him, and I am taking this medium to answer Jim's card, with the hope that it may be helpful to others.

WHAT'S COMING IN SALARY RULES

Engineers • The most vital problem facing employers in new plants is recruiting skilled personnel. A special study is being made of engineers who are in great demand. And regulations will be as flexible as possible.

Supervisors • Another knotty problem on which the Board is working and beginning to see light has to do with the maintenance of the traditional differentials that have existed between the wage workers and their immediate first line of supervision. That differential has been disappearing and in too many cases the wage worker is taking home more pay weekly than his boss. The same has been true where professional engineers have been supervising the work of draftsmen who are paid on an hourly basis, and so on all across the industrial scene. By the time you read this, the Board should have announced its policy—a policy to permit the maintenance of the traditional differential between hourly paid workers and their foremen or other supervisors.

★ *For how Jim (or you) can*

HOW SALARY STABILIZATION STARTED • The salary stabilization program really started in September a year ago, when Congress passed the Defense Production Act of 1950. The same month the President, by Executive Order, created the Economic Stabilization Agency. The President, before using the teeth of the Act, appealed to labor and management for voluntary controls of wages and prices. These voluntary controls did not work. Let me repeat — they did not work.

The salaried white-collar worker suffered most of all. His income did not keep pace with the cost of living. Savings of hundreds of thousands of families evaporated. Savings bonds were being cashed in at such a great rate that in some months more bonds were cashed in than were sold. Many people actually had to sell their bonds to live. And the dollars they got for these bonds were worth less — considerably less — than the dollars that purchased them.

Then, in December, 1950, the Wage Stabilization Board was set up to handle not only wages, but salaries.

To be able to stabilize wages and salaries effectively, it was necessary to freeze both and then to relax from the freeze. January 25, 1951, was the freeze date.

The cases brought before the Wage Board the next few weeks made it plain that problems of wage earners and salaried earners differed widely. Wages and salaries, from an administrative standpoint, just did not mix.

Therefore, on May 10 of this year a Salary Stabilization Board and Office of Salary Stabilization were set up. Actually, the Board was not sworn in until July 10.

HOW THE SSB IS SET UP • The function of the **Salary Stabilization Board** is to set the policy — and it is the function of the **Office of Salary Stabilization** to carry out these policies. All five members of the Salary Board represent the public (unlike the Wage Board, on which there are 18 members, six each representing labor, management, and the public).

The policies of the Salary Stabilization Board parallel the policies of the Wage Stabilization Board insofar as practical. The only justification for deviation is where conditions or procedures of compensation affecting employees under the Salary Stabilization Board are different from those of employees under the Wage Stabilization Board.

The SSB has three big aims:

1. To maintain historical relationships between salaries and wages, and to assure equal treatment for all.
2. To preserve the basic salary policies which enable business to operate as flexibly as possible, with a minimum need for submission of petitions for rulings on the cases of individual employees.
3. To preserve the incentive system, which is the root of the American system of free enterprise, consistent with the needs of economic stabilization.

HOW SALARY RULES ARE ENFORCED • To guarantee effective enforcement, the use of subpoenas and inspection authorizations to obtain complete information as to payroll practices is provided for. It should be pointed out that intentional failure to keep reports and records available is a violation.

The Office of Salary Stabilization is a cog in a nation-wide program to keep our economy on an even keel while getting ready for any eventuality. The thesis of the regulations, as I have stated previously, is to make them as self-administered as possible. But we will have no truck with "chiselers."

WHO'S COVERED • The Salary Stabilization Board has jurisdiction over executive, administrative, and professional employees, and outside salesmen — generally those employees not covered by the federal Wage-Hour law, *if* they are not represented by a bargaining agency.

The Wage Stabilization Board has jurisdiction over hourly workers and any salaried employees represented by a labor union.

WHAT SSB HAS DONE TO DATE • The first Salary Stabilization regulation was issued, by the Economic Stabilization Agency, July 5, 1951, even before the Board was organized. This was necessary to cope with the several thousand cases that had been transferred to us from the WSB. We had to have something to work with.

Regulation No. 1 is merely an adaptation of the WSB regulations. It deals with 10% increases in salaries and other compensation to correct certain inequities, cost-of-living increases, maintenance of relationships between salaries and wages, individual salary adjustments, and salary schedules for new plants. It also covers increases for state, county, municipal, and other non-federal government employees, as well as for employees of religious, charitable, and educational organizations.

Regulation No. 2 deals with bonus payments.

Regulation No. 3 has been incorporated in the revision of Regulation No. 1.

As I am writing, regulations are forthcoming on: salesmen's commissions, stock option and purchase plans, inter-plant inequities, and maintenance of foremen's differentials, especially for extended work weeks.

HOW YOU CAN GET HELP ON YOUR PROBLEMS • The Office of Salary Stabilization is taking every step possible to inform employers of their responsibilities under salary stabilization. In addition to the ordinary public liaison and information activities designed to spread through newspapers, periodicals, radio, and various labor relations services detailed information about the program and the regulations, we have an office in Washington devoted to answering specific questions raised by representatives of employers personally or by long distance telephone. This small staff, known as the Industry Relations Staff, is a team of five ready and willing to help industry to find the answer to its problems. This activity is being used increasingly by employers.

WHY SALARY CASES DON'T GET FASTER ACTION • Many industries have complained — and there *have* been complaints — that they have not gotten fast action on their problems. That is true. The main reason for delays has been that when the Office of Salary Stabilization was set up, a large block of cases was transferred to us from the Wage Stabilization Board. We still have a large backlog of cases. On this point, I have to ask you to be patient. As new policies are developed by the Board, the rulings will be speeded up. However, I want to emphasize that of late the cases that are moving over my desk bear September and October date lines, whereas only five or six weeks ago the dates were June, May, and even February.

get a raise — or how you give one — please turn the page ⟶

Begins on page 68

How Jim Can Get—and How You Can Legally Give—Salary Increases....

AS TOLD BY
JOSEPH D. COOPER Executive Director,
Office of Salary Stabilization

Author Cooper is a career man in government service. Though he's still only 34 years old, he has already had 18 years of experience in Washington since he got his first job as messenger.

He's a self-made man educationally, too. Working days and attending schools at night, he has managed to pile up an impressive list of college degrees: Bachelor of Science (1944), Master of Arts (1947), and Doctor of Philosophy (1951).

Cooper's rise in government service has been as impressive as his educational progress. He has had successively more responsible assignments since before the end of World War II, in the Office of Price Administration, United Nations Relief and Rehabilitation Administration, and the Department of State, where he was chief of the Procedural Coordination Branch.

As executive director of the OSS, Cooper is the "headache man" of the salary stabilization program. His office is the one that interprets and enforces the policies set up by the Salary Stabilization Board, and rules on petitions submitted by industry. He's the traffic cop of salary stabilization—and here he tells you the rules of the road.

Jim can get a promotion (and raise).

Salary regulations do not "freeze" the employee, but rather the compensation for the job itself.

If a company uses the *salary range method of payment,* the promoted employee may be paid the salary within the range that is in accordance with practice set forth in a written established plan in actual operation January 25, 1951.

If such a written plan did not exist, the promoted employee may be paid a salary corresponding to his ability and training, provided such a salary is not in excess of the salary paid to the employee having the most nearly comparable duties and responsibilities.

However, in no event may the employee's salary be increased to a salary above the maximum of the salary range of the position to which he is promoted.

If a company uses the *personal or random method of payment,* an employee may be promoted or transferred to a higher-paid position and increased to a salary corresponding to his ability and experience. However, such a salary cannot be above the highest salary paid to the employee having the most nearly comparable duties and responsibilities, as established by company records.

It is apparent, therefore, that nothing in the salary stabilization regulations is designed to stifle initiative, or prevent promotions with accompanying increases in salary.

However, where an employee receives an increase in salary due to promotion, or transfer to a higher paid position, an officer of the firm, not a subordinate, must certify under oath that the promotion or transfer which has resulted in the increased compensation is bona fide.

Jim can get a bonus.

Bonuses have been an integral part of American business for many years. They range from a week's salary at Christmas to sums that in some cases exceed an employee's yearly salary.

These bonuses are rewards for work well done. Definitely, they are compensation, and therefore come under the regulations of the Salary Stabilization Board.

The Board in its Regulation 2 divides bonuses into these classes:

1. Bonuses set by contracts which provide a formula for determining the amount of bonus and how it is to be distributed.

The SSB points out that if the bonus contract was in writing and in effect January 25, 1951, such a contract is definitely part of an employee's pay. So it is permitted to operate, although there can be no change in the formula which would result in an increase in compensation.

2. Bonuses based on an established plan, such as a percentage of the profits distributed among key employees, with allocation discretionary. These bonuses are stabilized under a yardstick, known as the "base period bonus fund." This yardstick may be either:

a. The total of all bonuses paid by the company in 1950.

b. One-third of the total bonuses paid for any three years during the 5-year period from 1946 to 1950, inclusive.

Employers are given these alternatives because to some companies 1950 was not a typical year. Under Regulation 2, bonus funds of this type may be increased if the employer has taken on additional employees in the bonus group. Similarly, the bonus fund must be decreased if the bonus group decreases in number. Therefore, average annual bonuses may be paid despite fluctuations in employment.

3. Completely discretionary bonuses, or those that are generally given, but under no specified plan. The formula is the same as for bonuses based on an established plan. That is, the yardstick may be either the total amount of bonuses paid for 1950, or one-third of the total bonuses paid for any three years during the 1946-1950 period. These discretionary bonuses are subject to the same increases and limitations as the second category of bonuses paid under an established plan.

Apart from profit sharing bonuses, employers may also pay Christmas bonuses on the same basis as they did in 1950. But the amount of bonus must not have already been paid out under Regulation 2.

All employers are required to keep records of bonus payments for three years. If a bonus fund is increased, according to provisions of Regulation 2, the amount and the basis of the increase must be filed with the Office of Salary Stabilization within 30 days after payment.

Turn the page

Jim can get a merit or length-of-service increase...

Jim's employer can also give him a raise in the form of a merit or length-of-service increase under certain conditions:

If the employer has had an established salary plan or salary ranges for certain positions, and if these were set forth in a plan or written schedule in effect on January 25, 1951, he may make merit or length-of-service increases in accordance with his past practice. He may not exceed 6% of his payroll in any one year. Regardless of his plan, however, he can bring the amount up to 6%.

Where employees are paid through the *personal or random method of payment*, the employer may grant merit or length-of-service increases without approval within these limitations: (1) The total amount of such increases combined may not exceed 6% of their aggregate base salaries; and (2) the maximum increases granted to any one employee may not exceed 10% of his salary.

Under no circumstances, may the total dollar amount of all merit and length-of-service increases combined that may be granted in one calendar year to all employees exceed 6% of the total of their base salaries during such year.

It should be made plain that these merit or length-of-service increases are *in addition to* the so-called 10% catch-up formula in Regulation 1. This formula provides that an employee who has not received a raise since January 25, 1950, may be given a 10% raise now.

...a cost-of-living increase...

This isn't automatic. Jim's employer can grant a cost-of-living increase without prior approval only under certain circumstances: The increase must be required by the terms of a cost-of-living provision in his company's *written salary plan*. And the written plan must have been formally determined and communicated to the employees before January 26, 1951.

...a general increase...

Jim also can get the benefit of any *general* increase his employer can legally give under the 10% catch-up formula provided for in Regulation 1.

...an intra-plant inequity adjustment.

The Salary Stabilization Board has not approved any cost-of-living increase except as provided for under written salary plans in effect before January 26, 1951. Where, however, increases have been given to employees under the jurisdiction of the Wage Stabilization Board—either because of increases in cost of living, or for other reasons approved by WSB—the employer can compute the amount by which the payroll for these employees has been increased. He can then pay increases to his employees who come under the Salary Board's rules—up to the same percentage of increase. This is to remove inequities.

JIM'S WAGE INCREASE SCORE

It is obvious, of course, that our friend Jim couldn't and wouldn't get all the kinds of increases that have just been outlined. But one basic point should by now be quite clear: Jim *can* legally get salary increases for a variety of legitimate reasons, as defined by regulations. Jim and his fellow white-collar workers are *not* forgotten men. On the other hand, neither are they favored over other employees.

Furthermore, there are clearly defined limits on increases that may be granted without prior approval. Thus, the requirements of broad public interest are also being met—to keep salary increases from contributing to inflation.

As former SSB Chairman Allen has said:

"It is not our objective to say how business shall run itself, or how it shall pay, but, within the existing practices, what some of the limits are. There have to be limits to prevent inflationary practices."

What about Jim's salary in a new plant?

A vexing problem comes up if Jim's employer is starting a new plant. Many such plants are linked closely to the national defense program. Others are designed for consumer goods. And still others are planned for quick conversion from peace to war, as recommended by Defense Mobilizer Charles E. Wilson.

But whatever the purpose of the new plant, there is the important question of salaries. No plant is any better than its administrative, executive, and professional personnel, it has been said; and management, realizing this, is often willing and anxious to pay unusually large salaries for the talent it wants and needs. This is especially true of a new enterprise.

It is not always realized that compensation of administrative, executive, and professional personnel is under the jurisdiction of the Salary Stabilization Board. Too, with the many details to be looked after in getting a new plant into production, the regulation defining just what the employer is required to do regarding salaries may be overlooked.

A new plant, under Salary Stabilization Board Regulation No. 1, is defined as one which, on January 25, 1951, had not begun the production of the materials or services for which it was established or converted.

A new plant does not necessarily mean an industrial plant. It could mean a new advertising agency, sales organization, or any new business.

New plant employers must file, at least three weeks prior to the proposed date of hiring, a schedule for salary rates. If they have not heard from the Salary Stabilization Board by the time they plan to open the plant, they may put the proposed salary rates into effect, but they must tell their employees the salary schedules are tentative.

In a new plant of an existing enterprise, established at the same location, the salary schedules must be the same as the lawful rate in an existing enterprise.

In all other cases the schedule of salaries for a new plant shall not exceed the rates for the same or comparable jobs in the same industry in the same local labor market area.

This rule means that the employer who lives up to stabilization regulations is protected against pirating of his employees by a less scrupulous competitor offering them higher salaries than permitted in the fight on inflation.

These rules do not mean that a man cannot go from one plant to another for a more responsible job at a higher salary. He can. Nothing in the salary stabilization regulations prevents this. It is the job itself which is subject to regulations rather than the individual.

The report on a new plant filed with the Office of Salary Stabilization should include:

1. A statement of the facts relied upon to support the conclusion that it is a new plant.
2. A schedule of the rates of salaries which are in effect for each job classification.
3. A statement explaining how the criteria for the salary schedules were established.

An employee transferred to a similar position in a new plant may continue to be paid in accordance with the salary plans in the old plant. However, if such an employee had been employed at the plant from which he was transferred for less than one year, the employer, within 10 days after such transfer, must file a report stating:

1. The name of the employee.
2. The position which he occupied at the plant from which he was transferred and the duties and responsibilities of such position, together with the salary and other compensation which he was paid at such plant.
3. The position which he occupies at the plant to which he was transferred and the duties and responsibilities of such position, together with the salary and other compensation that he is paid at such plant.
4. The salaries of the two most nearly comparable positions at the plant to which he was transferred, the date upon which such salaries were fixed, and the duties and responsibilities of the positions at which such salaries are paid.

How do new or changed salary plans affect Jim?

Can Jim get an increase because his employer sets up a new salary plan, or changes his old one? It all depends.

New salary plans or modifications of existing salary plans to govern individual salary increases require *prior approval* by the Office of Salary Stabilization. This applies either to existing plants or to a new plant.

The plan submitted to the Office of Salary Stabilization must include: (1) a description of each position or classification; (2) the grouping of positions into grades, if any; (3) salary range for each position or classification; (4) specified limits for increases; and (5) the time or times for review for the purpose of merit or length of service increases. The Office of Salary Stabilization is authorized to approve new salary plans or modifications of existing salary plans in the light of the employer's past practice and of relevant practice in the industry, occupation, or area, as may be appropriate. Adequate data in support of the application must be submitted by the applicant.

▶ TO TEST YOUR READING ABILITY...

Read this article at your normal rate of speed for general information. Record your exact reading time in minutes and seconds; use a stopwatch or watch with a second hand. Be sure that as you read you understand the various phases of the program described in this article. When you have finished reading, answer the questions on page 270.

For details on "How to Read Faster and Better" by taking FACTORY's monthly reading test, see the article on page 84 of the October 1951 issue.

Or write for a reprint of that article. Address: The Editor, Factory Management and Maintenance, 330 West 42nd Street, New York 18, N.Y.

CONTEST STANDING of employee teams at Westinghouse Electric's Jersey City plant is shown on plant scoreboard. Competition kept attention focused on quality-improvement program. Figures show reduction of reject cost from base period.

A FOUR-POINT PROGRAM SHOWS

How to Cut Reject Costs 80%

By D. H. BAUM • Superintendent of Quality Control
Westinghouse Electric Corporation, Jersey City, N. J.

IN TWO YEARS, we've cut the cost of rejects by 80%. Cost of field adjustment of parts is down one-third —and still going down.

Our quality-improvement contest for employees has kept attention focused on an over-all program which has given us all these things: cost reduction; improved work tools; improved inspection tools and methods; higher morale among inspectors; and better quality of purchased parts.

When we analyzed our quality program, we found we had to attack on all these fronts:

1. **Inspection techniques** were not the best available—such as first-piece and patrol inspection.
2. **Workers' skill** didn't always measure up to the quality potential of the tools and fixtures.
3. **Tools and fixtures** often were not designed for high production.
4. **Group leaders often tried to solve problems,** instead of calling on foremen.
5. **Workers' and inspectors' training** didn't meet requirements.
6. **Workers didn't understand** the effects of poor quality.
7. **Inspection methods for checking** purchased parts were inadequate.
8. **Pride in workmanship was lacking**—with poor housekeeping one of the prime symptoms.

A contest alone can't solve those problems—we didn't kid ourselves on that. But we also knew a solution required employee cooperation.

So we adopted a contest as the cornerstone of a four-point program. We used tested methods.

Here's how the program works.

1 BUILD EMPLOYEE COOPERATION · The division manager started the ball rolling by appointing a quality improvement committee. The superintendent of quality control was named chairman and all general shop foremen became members of the committee.

"Quality is everybody's business" was the theme for the initial blast of publicity in the plant newspaper. Articles by various members of management stressed the need for better quality of products. Soon after this we started the build-up to a quality-improvement slogan contest.

The first tip-off that something else was in the wind was the sudden appearance of posters bearing a large question mark on bulletin boards throughout the plant. Other similar teasers kept interest alive.

"Let's join the movement for quality improvement" won the slogan contest—and $25 for the employee who submitted it. At a special noon meeting the manager of manufacturing presented first and second prizes, then announced "Q-I"—the quality-improvement campaign.

The campaign is a team contest in reducing the cost of rejects. The cost for any period is the total cost of scraping or repairing defective parts produced by a team in the period, divided by the total productive man-hours worked.

For example, let's assume Foreman Miller's group spent $500 for scrapping and repairing defective work during a three-month period, and worked 50,000 man-hours. That's 1.0 cents per man-hour. Assume Miller's team had a base-period cost of 2.4 cents per man-hour. The improvement is 1.4 cents per man-hour, or 58% (1.4 ÷ 2.4 x 100%).

There are two groups of teams, foremen and general foremen teams. There are six foremen teams of productive workers only, each team captained by the foremen to whom the workers report. Two general foremen teams include all non-supervisory employees in the manufacturing department. Productive workers are on two teams, a foreman's team and a general foreman's team. All other non-supervisory workers are on one or the other of the general foremen's teams.

Every contest period a merchandise prize is given to the foreman's team and to the general foreman's team with the best per cent improvement in cost of rejects. A drawing determines the individual on each team who takes home the prize. We awarded prizes each month during the first five months of the campaign. Since then, we've been giving the prizes quarterly.

2 TRAIN KEY PEOPLE · We set up a training program in quality control for all shop supervisors and manufacturing engineers. Eight monthly sessions of two hours each demonstrated our philosophy of quality control, its principles, and how to put these principles to work. We covered the requirements and benefits of quality control, first-piece and patrol inspection, sampling, and control charts.

We used the learning-by-doing methods, too. Each foreman investigated a trouble job in his section, worked out improved quality control, and reported in class how he did it. Besides driving home the practical value of the new knowledge, each assignment cut reject costs a bit.

3 IMPROVE INSPECTION METHODS · During the training period we tossed out the old 100% inspection system, and installed first-piece and patrol inspection.

First-piece inspection tells you if quality is under control at the start. If the first piece (or pieces) of a run is OK, the process is under control. Production proceeds. If initial production doesn't meet the "specs," there's no production until the process is corrected.

Patrol inspection tells you how the quality is holding up on a process. It requires periodic checking of samples of production. If quality gets out of line, the process is stopped until corrections are made.

The changeover from 100% to first-piece and patrol inspection created problems. We held meetings with the inspectors regularly to clear up these problems. We let the inspectors air their opinions, get the gripes off their chests. Then everyone pitched in to help solve the problem. Supervisors and engineers found the inspectors on their side to help sell production workers on better work habits.

The switch in inspection technique brought about other improvements that helped cut rejects. Suggestions for more and better tools for inspection and processing, mechanical and electrical tests for assembly and sub-assembly, better work stations for inspectors—clean, orderly, and well lighted. Prestige and morale of inspectors rose with the shop "Q-I."

We applied the same technique to purchased parts. We kept suppliers informed on the quality of their products, cut out loss in man-hours spent on parts that wouldn't pass in the end.

4 ANALYZE FIELD COMPLAINTS · We also had the special problem of complaints from installation crews in the field regarding their troubles in assembly. It's like customer complaints.

We set up a complaint committee, with the superintendent of quality control as chairman. Members of the committee represent engineering, sales, manufacturing, service, and construction departments.

The factory construction department receives and screens complaints from the district construction engineers. Factory construction gives them to the secretary, who records them and gives copies to the committee members involved. They investigate and recommend corrective action. The recommendations are reviewed, agreed upon, and effected. We let the district construction department know when to expect the change in product.

FOUR PAGES OF NEW IDEAS:

How Power Brushes Solve Production Problems

NEARLY EVERY PROGRESSIVE PLANT is finding ways today to use power brushes to speed production.

Here are 11 examples of how this tool has solved production problems — how power brushing can do the job faster, better, cheaper. All the possibilities are not here; these are the highlights of a quick look around. Maybe there's one here you can use. Maybe there's one to give you an idea on a similar problem of your own.

Brushes serve two main functions:

1. To blend surface irregularities, rather than remove quantities of the original material.

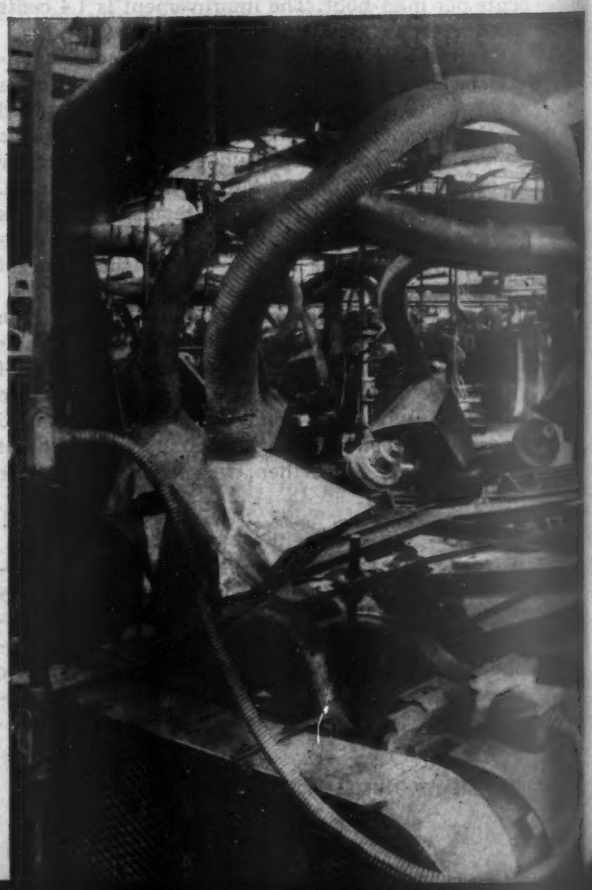
2. To remove foreign material from a product—scale, grease, flashings, corrosion, etc.

Brushes come in a variety of materials, sizes, and shapes. You must use the right brush for the job to get best results—or, in some cases, to avoid disaster. All are designed for specific jobs.

STRIPPING INSULATION

Problem: How to strip about an inch and a half of enamel insulation from one end of rotor wires.

Solution: A fixture holds and rotates the rotor, forces the extended wires between counter-rotating wire brushes. The fixture rotates at 8 rpm., the brushes at much higher speeds. The brush method speeds preparation of the leads for soldering without damaging them.



CLEANING CHAIN CONVEYOR

Problem: How to eliminate the production delay caused by stopping machines in order to clean a conveyor.

Solution: A pair of wire brushes cleans scale deposits, excess grease, oil, and dirt from the conveyor chain as it emerges from the bonderizing bath. The 15-in. diameter brushes are mounted on opposite sides of the chain.

REMOVING BURRS

Problem: How to remove burrs and sharp edges from the threads of studs.

Solution: Feed the studs into an inclined pipe that carries them to the brush by gravity. A cut-away section of the pipe exposes the studs to the brush. A small end brush positions the studs for brushing. The pipe guides the finished studs by gravity to a container.

PREPARING FOR PLATING

Problem: How to prepare formed steel products for plating.

Solution: Wire brushes reduce and blend the grit marks on these auto bumpers to permit a smooth plating finish. Three setups polish top edge, face, and curved ends separately. This method cut costs and the number of rejects.

For seven more power brush applications please turn the page.

HOW POWER BRUSHES SOLVE PRODUCTION PROBLEMS

Begins on page 76

TREATING INTERIOR SURFACES

Problem: How to blend lubricant into the pores of cylinder walls and remove the excess.

Solution: A set of six strip brushes does the job in less than one minute. Six sets, one for each cylinder, are mounted in a multiple-head vertical boring mill. Spring tension plus centrifugal force throws the brush face against the inside diameter of the bore. The head runs up and down about eight times and is withdrawn. It's claimed that brushing is cheaper than the former honing method. Also, brushing cuts reruns 75%, eliminates machine delay due to clogging. Brushes run at 75 rpm.

MAKING CONCRETE PIPE

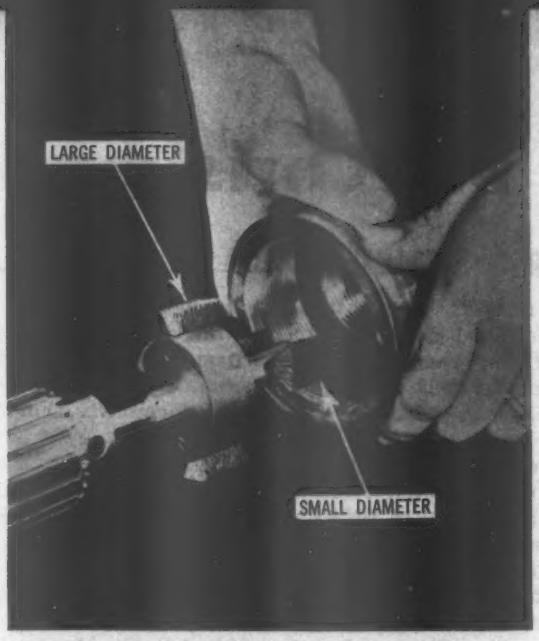
Problem: How to coat steel cylinders with concrete to make concrete pipe.

Solution: Counter-rotating brushes extrude the concrete between them, throw it against the steel core. The brush carriage travels the length of the pipe, which revolves. Speed of carriage and pipe controls thickness of the concrete.

CLEANING CYLINDRICAL PARTS

Problem: How to clean and blend surface irregularities of cylindrical parts after grinding.

Solution: A large wire brush on a conventional centerless grinder provides "centerless brushing." The pistons are fed by gravity. A small wheel, near the brush and at an angle, rotates the pistons and drives them past the brush.



DEBURRING INSIDE DIAMETERS

Problem: How to deburr the threads on two inside diameters of small parts.

Solution: One wire brush setup does both at the same time. The brushes are mounted in a multiple holder, driven by a bench motor.

PREPARING FOR PAINTING

Problem: How to clean dirt and scale from large assemblies for painting.

Solution: A cup-brush on a portable tool cleans both the open surface and hard-to-get-at spots on this concrete mixer.

REMOVING EXCESS BRAZING

Problem: How to remove excess brazing from cylinders formed of hot-rolled steel.

Solution: Place the cylinder on the traveling carriage under a power-driven wire brush. Brushes of various diameters are used to match the contour of the cylinder being worked on. Saves time and money over cleaning with portable sanders.

SATIN-FINISHING ALUMINUM

Problem: How to apply a satin finish to aluminum tubes without damaging the mounting holes.

Solution: The rotating brushes travel the length of the tube. The tube rotates at about one-tenth the speed of the brushes. As one tube is being brushed, the operator places the next one in the work holder.

WHAT 160 COMPANIES ARE DOING

THIS YEAR ABOUT ...

Two Big Christmas

... WORK SCHEDULES

NOWADAYS it's taken for granted that all but a handful of maintenance and custodial workers will enjoy the day off on the Christmas and New Year holidays. But it may shock you to realize the extent to which industry allows time off in the year-end holiday season in addition to the holidays themselves. For example:

• **Monday before Christmas.** Since Christmas and New Year's Day fall on Tuesdays, what to do about Monday is a vexing problem. But about 90% of BNA's panel have made up their minds, so the solutions are a pretty good picture of the thinking of the whole group.

One-third of the companies say they will give no time off the Monday before Christmas. Close to 35% of large companies and 20% of small companies are giving the *whole day off*. About a quarter of the large companies and a third of the small ones will give half a day off. The remaining 10% of plants will operate short shifts or send employees home two or three hours early.

One plant reports employees will work the Saturday after Christmas to make up for the Monday holiday, at straight-time pay. Another plant gives half the employees the Monday before Christmas, and the other half the Monday before New Year's.

... PARTIES

SOME KIND OF CHRISTMAS PARTY takes place in more than three-fourths of the companies surveyed. Formal company-sponsored parties are the rule in 54% of the smaller companies and 34% of the larger. A few others have formal employee-sponsored parties. Informal parties are allowed or sponsored in 57% of the companies, some of which also hold formal parties.

There are three main types of parties:

• **Parties for employees only.** Most of these are small, informal gatherings in each department. They are usually planned and financed entirely by the employees. Typically, they occur the last working day before the holiday, and employees stop work early to participate. They are more popular among office groups than in the shop.

• **Family parties.** These are normally for employees and their wives or husbands, or boy-friends or girl-friends. They're usually held outside the plant and after working hours. Mostly they take the form of a dance or dinner-dance, but many variations are reported: theater parties, Christmas carol "sings," festive plant open-house, formal banquet that also honors "old-timers." Family parties are the least popular type, practiced by only about 10% of companies reporting.

• **Children's parties.** About 20% of the companies surveyed reported they hold children's parties. A few also hold other parties as well. Two themes crop up in comment about these parties: Christmas is essentially a children's holiday, so such parties are particularly appropriate. And as one man puts it, "If you please the boy or girl, you please the parents also."

Most of the parties follow a familiar pattern: entertainment, gifts handed out by Santa, candy, and refreshments. Sometimes a *combination* party for children and grown-ups is held.

Here are the pointed, timely results of a survey by The Bureau of National Affairs, Inc., Washington, D. C., a private agency widely known for its factual reports and analyses in the fields of industrial relations and personnel management.

This report is based on the replies of 160 members of BNA's Personnel Policies Forum — a group of plant industrial relations executives representing a cross section of industry.

The full report, of which this is a part, is published by BNA under the title, *Bonuses, Benefits, and Binges — A Survey of Employers' Year-End Problems.*

Problems...

• **Monday before New Year's.** Practice in giving time off before New Year's day is less liberal. Fully 50% of the companies that allow some time off before Christmas require employees to work the Monday before New Year's. About a quarter of the large companies and 15% of the smaller ones will give employees *all day off*. About 15% of both large and small companies will give up to half a day off, or will have short shifts that day.

"Day off before and after Christmas Day." (*Ferrell Dillard, director of industrial relations, The Pierce Governor Company.*)

"Shutdown for annual maintenance work." (*F. V. Cowing, vice president, Repcal Brass Manufacturing Company.*)

"This company for years has granted all hourly rated employees who have six months' service a vacation of one week with pay at Christmas and one week during the summer. We shut the entire organization down on Christmas Eve and re-open the day after New Year's." (*R. W. Norris, personnel manager, Philip Morris & Company, Ltd., Inc.*)

"If the employee requests the day off, and work schedules permit it, it will be granted." (*R. J. McCullough, industrial relations director, American Potash & Chemical Corporation.*)

"We allow one day time off for shopping." (*W. J. Larsen, industrial relations director, Kendall Refining Company.*)

"Department managers are given considerable latitude in excusing employees for various reasons." (*Fred W. Clymer, vice president, Goodyear Tire & Rubber Company.*)

What about unexcused absenteeism?

Less than 20% of the plants say they have any special problems with unexcused absenteeism, despite the holiday season's conviviality. The almost standard practice is to require attendance on certain days—usually just before and after the holiday—to qualify for holiday pay. A few companies require attendance all the holiday week to qualify.

Parties for *underprivileged children* are given by a few companies. These are usually in addition to whatever is done for employees' children. It's a good idea and is becoming more popular.

Should drinks be served?

The majority of panel members who expressed an opinion vote for dry parties. Main reason for the thumbs-down attitude: Liquor-lubricated parties have a tendency to get out of hand. It becomes difficult to control personal behavior. And lapses, especially on the part of representatives of management, are likely to defeat the very purpose of improved understanding and good will for which the party is held.

Despite the majority feeling against the serving of drinks, a sizable group of plant executives feel that liquor has a place at holiday affairs, and that the privilege—if not abused—helps the festivities. As one man puts it: "It seems not only expected, but in keeping with the spirit of the season."

Most of those who voted for drinks at Christmas parties added that "moderation" was necessary. Here are some of their suggestions on how to get moderation in actual practice:

"I would recommend a 'friendship hour' of not more than 45 minutes when alcoholic beverages could be served. The source of supply should then be totally discontinued." *J. R. Bowen, personnel director, Mountain Fuel Supply Company.*)

"We have an unwritten rule that a certain quota of alcoholic beverages will be served and when that is exhausted, it is not to be replenished. This has the effect of restricting consumption, even though some individuals may get more than their share." (*Kenneth Rutledge, personnel director, Ramsey Corporation.*)

"Permit limited amount of beer to be served." (*John Kirtley, director, public and employee relations, Texas Gas Transmission Corporation.*)

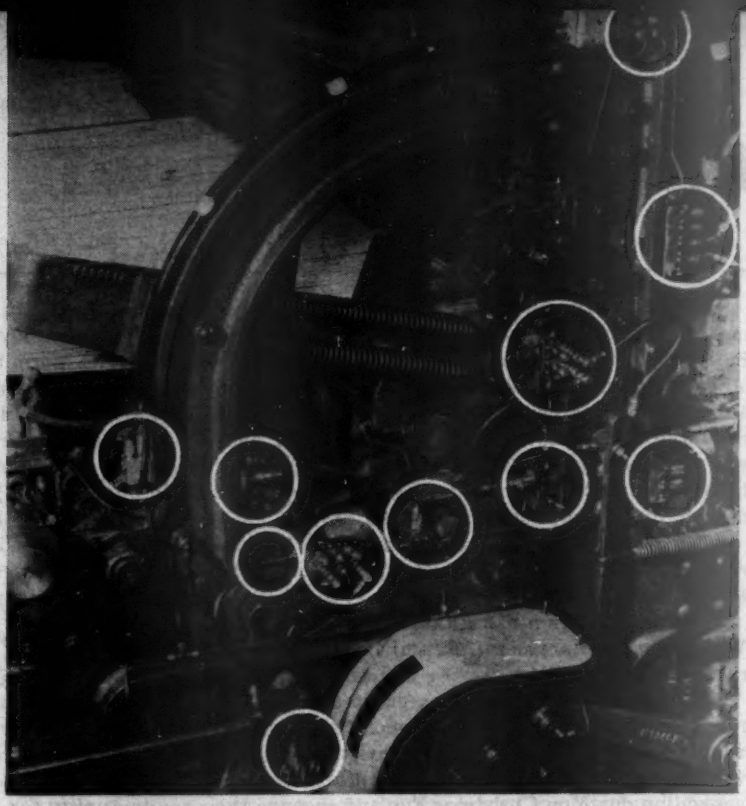
"The answer to the problem of alcoholic beverages seems to vary with area—accepted practice in New York, Chicago, New Orleans, etc.—not suggested or permitted in plants or offices in smaller communities, Midwest, etc., using our experience." (*Dudley M. Mason, personnel research director, Armstrong Cork Company.*)

"It depends on the type of party. If only a small group of employees are involved, the amount of alcoholic beverages served can be controlled. Then again, if the party is held on company property where a company rule prohibits alcoholic beverages, management would be violating one of its own rules and could be accused of being inconsistent." (*W. J. Larsen, industrial relations director, Kendall Refining Company.*)

To sum up the advice of panel members: To keep parties at which liquor is served from becoming brawls, do two things: Keep the parties short. And keep the total available liquor supply scant.

You can use centralized lubrication in almost any plant to get easier maintenance, steadier output with less spoilage of product, and savings in labor and lubricant.

That's what Alexander Smith, Inc., says — speaking from experience. It's using the automatic system on more than 80 textile machines, and today plans to put it on 27 more.



LUBRICATION NOW is built into this loom at Alexander Smith. Injectors (circled) automatically grease 200 bearings — mostly every hour.

Automatic Lubrication Supplants

By CHARLES E. BARRETT • Director of Engineering, Alexander Smith, Inc., Yonkers, N. Y.

AUTOMATIC LUBRICATION on a large scale is no longer an engineer's dream at Alexander Smith's carpet plant. It's a profit-paying reality. We installed our first automatic centralized lubricating system more than six years ago. Since then we have added similar systems to 84 other production machines. In each case the installation more than paid for itself in savings to production, maintenance, and consumer. So we're going to extend the system to even more machines.

As we see it these are the two big bonuses in automatic lubrication:

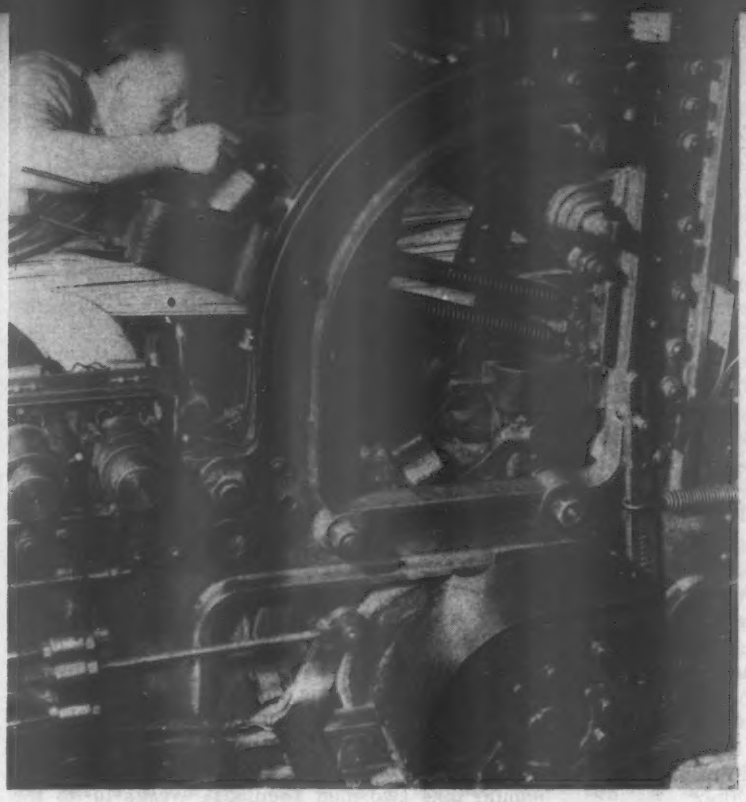
1. Peace of mind • That's right. You might call it reliable lubrication. But it's our way of saying that we no longer have to worry whether each bearing gets the right amount of lubricant in the right place at the right time. And some of our machines have over 200 lubrication points.

2. A handsome profit • Just look at the box score above of the pay-off on one Axminster loom. Savings in labor, materials, and production downtime paid for this installation in less than a year.

How we got started on automatic lubrication

Though the savings are now obvious, it took an emergency to get us into automatic lubrication. We were having trouble with our twisters. On these machines, travelers (steel arms), spinning at 3600 rpm., impart a hard twist to the wool yarn. Each traveler rides on a steel ring. What with this steel-to-steel contact at high speed, and with the abrasive action of the wool dust, we had plenty of burnouts. The travelers would snap and fly off—in many cases causing serious accidents.

Though the average life of a traveler was several hundred hours, we had to change them every 80 hours just as a safety precaution. When you talk in terms of 120 travelers to a machine, that becomes a serious production bottleneck. Other meth-



AUTOMATIC LUBRICATION COST vs. SAVINGS

Total installation cost (includes labor, materials, and overhead, but not loss of production caused by installation downtime) $1200

ANNUAL SAVINGS	PER LOOM	% SAVING
Labor (oilers)	$140	90%
Lubricant	40	30
Production downtime		
for lubrication	608	100
for repairs, etc.	409	20
Maintenance and repair of looms		
labor	45	20
parts, tools, etc.	500	10
	$1742	

Increased machine life	
machine	15
wear parts	30
Product spoilage	25
Greater safety	Intangible
Reliable lubrication .	Intangible

OLD OILCAN SYSTEM took loom oiler into tight spots. Little wonder that bearings were often missed, carpeting frequently damaged.

BOX SCORE shows how system paid its way in less than a year.

Oilcan and Quickly Pays Off

ods of lubrication failed. They weren't reliable.

But when we applied automatic grease lubrication to each traveler ring, we extended traveler life from 80 operating hours to 400.

After this impressive start, we began to realize that automatic lubrication could do a job for us on other production machinery. Most carpet-making equipment has a great number of moving parts—up to 228 bearing surfaces on our Axminster looms. Many of these bearings are not readily accessible. Still others are too close for comfort to exposed moving parts.

With our scheduled oilcan system of lubrication, we couldn't do a proper job on these machines. Vital bearing points were often missed. Sometimes because the oiler was careless. Other times because we just couldn't stop production to lubricate. Then at the other extreme, we were plagued with the "old-school" oiler who would stand back, aim at a bearing, and flood it with lubricant and a prayer. Excess lubricant was causing a high percentage of carpet waste.

So we installed automatic lubrication on our slashers, setting frames, and looms. We put it on machines with only 24 bearing points, and on machines with 228 bearing points.

In each case we had to justify the installation to management on an economic basis. This was easy to do on the new machines. It wasn't so easy on older equipment. For management expected us to amortize first cost by immediate labor savings alone. But even on this basis we found that automatic lubrication could pay its way on existing equipment. Right now we are planning centralized lubrication for 27 of our older Axminster looms.

A typical installation is the setup on our new Axminster 16/4 looms. Each battery of six looms has its own central high-pressure pump. This pump, mounted on the original grease container, delivers lubricant through main and branch lines to some 1300 bearings—more than 200 bearings per loom. Injector blocks mounted on the looms meter the exact amount of grease needed by each bearing.

Turn the page

How our maintenance department benefits

1. Reliability. Automatic equipment has taken the human element out of much of our lubrication. Except for infrequent breakage of hose or tubing, we know that critical bearing points will be properly lubricated as long as the machine is running.

2. Reduced labor costs. We haven't eliminated the oiler entirely. But it takes fewer men to handle the few points on each machine not tied into our automatic system.

3. Increased safety. Automatic lubrication has removed the hazard of careless oilers. Dangerous points are all lubricated automatically.

4. Reduced lubricant cost. Now we can feed each bearing only as much lubricant as it needs. Not much of the grease is wasted.

5. Standardized lubricant. We use one multi-purpose grease in all our automatic systems. This is more convenient, even though the grease we are using costs more than previous oil lubricants. We can dispense the grease straight from original containers. So there's a saving in handling.

6. Easy maintenance, less repair work. With proper periodic lubrication, moving parts run smoother, last longer. And with forced-feed grease lubrication, there's much less chance that abrasive wool dust will get into the bearings. On our new Axminster looms, we figure that automatic lubrication will extend the life of wear-parts 30%, increase the entire machine life 15%.

How our production department benefits

1. Less waste. Flooded bearings used to ooze oil, take a heavy toll in carpeting. With automatic lubrication we've cut carpet waste by 25%. For one thing the automatic system won't over-lubricate when working properly. Then too, centralized lubrication permitted us to switch from oil to grease. Grease tends to stay put in the bearings—more so than oil.

2. Less machine downtime. We've had fewer outages for repairs on machines equipped with centralized lubrication. And we never have to stop one of these machines for lubrication.

3. Increased operating speeds. When our older looms are equipped with automatic lubricators, we plan to up their speed (and production) by 12½%. We know they can take it as long as they get proper lubrication.

4. Lower power bill. Automatic lubrication will cut power consumption on our older looms by about 20%.

How we solved the problems of automatic lubrication

1. Installation · Installation of centralized lubricators on new looms was no problem. The loom manufacturer did the job for us. When the machines arrived, all we had to do was hook them up.

But all installations on existing equipment were handled by our own machinists and pipe fitters. We had sent these men to a special clinic run by the manufacturer of our lubrication equipment.

At first we relied heavily on the know-how of engineers from the manufacturer and distributor of our lubrication equipment. With succeeding installations we gained a great deal of experience. We were able to improve and modify each successive installation. But always during and after installation our distributor was "on call" to help.

We have one big job coming up now—the installation of automatic lubrication equipment on 27 existing Axminster looms. Each loom will have 175 bearing points (70%) under automatic lubrication. We'll tackle these looms one at a time. It should take two men about 3½ weeks to do the job on each loom. Why so long? We have to fit bearings to new oil holes—for one thing. The old ones are either improperly positioned or incorrectly sized to work with our automatic injectors.

A big job? Yes. But one we can justify. We'll spend about $40,000 on these 27 looms for materials, labor, and overhead.

The installation will result in a saving of two oilers. And it will greatly reduce the work load of the six remaining oilers in this department. On the basis of labor-saving alone, we will pay for the installation in nine years. That's within the rated life of the machines, so it was good enough for management. Actually, we know that the savings in dollars and cents will be much greater.

2. Breaking the system in · This usually takes about two weeks. First, each injector must be properly adjusted. Then for a week or so after installation, all points must be carefully checked.

3. Maintenance · We get broken tubing and connections in the automatic system from time to time—mostly due to carelessness or neglect. We've learned to protect and conceal tubing and injectors, as much as possible, in and around the machine frame. And in our next installation we'll be switching from copper to a stronger steel tubing. Rupturing of flexible hose has been another problem. Our solution here has been to substitute better quality hose and remove interfering parts.

4. Standardization of lubricant · Here again we got plenty of outside help. This time from an oil company. We tested several special greases. And finally came up with a multi-purpose lubricant that we could use in all our automatic equipment.

RETURN LINES FROM WELDING MACHINE
WATER COOLED AND AERATED
50-GAL. STAINLESS STEEL RECIRCULATING TANK
WELDING MACHINE

RECIRCULATING UNIT provides lots of cooling water for Solar Aircraft's welding machines. One 50-gal. tank takes care of up to three machines.

PAN CATCHES COOLING WATER from two feed lines on this seam welder. Water drains into collecting pump tank, is pumped back to the recirculating tank.

Saving $13,000 a Year on Water

That's the direct saving on water alone that you can attribute to this recirculation system for welding equipment. An even bigger benefit is elimination of shutdowns. It all started with a pump and a 55-gal. oil drum.

By DEL WOLFINGTON • Plant Engineer
Solar Aircraft Company, San Diego, Calif.

WE HAVE CUT our future water demand in half by a water-conservation program. Three-quarters of this saving—4½-million gallons—will come from a water-recirculating unit we developed.

The project began when a severe water shortage recently threatened our operations. Solar has 66 spot and roll welders that need 5 to 17 gpm. of water for cooling. Since this water is clean, why not reclaim it and re-use it in a self-contained system?

But we wanted to avoid a centralized reclamation system that meant a lot of cutting through our floors. So how about small, local reclamation units? We tried out this idea with ordinary 55-gal. metal drums and pumps. Except that water became hard and contaminated with rust, the idea worked.

This was the origin of our present recirculator package unit. It consists mainly of a 50-gal. stainless steel tank, a centrifugal pump, and a float valve. This assembly cost us about $285, including various pipe connections.

We also had to provide a soft-water distribution system for feed and make-up water to each circulator unit. Total cost of all the units will run around $80,000. Based on savings of $13,000 a year in our water bills the plan will pay for itself in about six years. No one can predict how much we may save by avoiding shutdowns caused by lack of water.

HOW THE SYSTEM WORKS • One 50-gal. recirculator unit can take care of a maximum of three welders. At each welder a shallow tray catches the cooling water and drains it to a catch basin leading to a pump. From 50% to 90% of the water used is reclaimed. This water is pumped through copper tubing to an open outlet about 18 inches above the open-top circulator tank. It gets aerated and cooled in the process of dropping into the tank.

Under a constant head maintained in the circulator tank, the water flows through the circulator and back through copper tubing to the point of use at the welder. Each tank has a float valve connected to an incoming soft-water supply line. This provides the necessary make-up water for loss and evaporation, also maintains the constant head.

We haven't found it necessary to insulate the water tanks. They don't radiate enough heat to create employee discomfort in our climate.

On some machines we can't recover the water because the parts being welded are too large to permit proper trays. Or sometimes the water gets too hot to re-use for cooling. In such cases we install electrically controlled valves that automatically close the water supply in the cycle when the welder is not operating.

IDEAS OF THE MONTH for

By LEWIS K. URQUHART • Managing Editor, FACTORY

SAFETY FOR SMALL BUSINESS is the idea behind the National Safety Council's new program. The council will give you a hand in organizing your safety program—if you employ less than 100. For details, write National Safety Council, 425 N. Michigan Ave., Chicago 11.

COMPANY DATA CARD designed for the employee's billfold summarizes all sorts of data about the Northern Natural Gas Co.—from its piece rates to number of employees and names of directors. Write to the company at Aquila Court, Omaha, Neb., to see how the card looks. They still have a few left.

RETAINING RINGS are tough to pick up from trays. But not from a specially designed stack. If you buy in lots of 1000 rings or more, Industrial Retaining Ring Co., 8 W. Sidney Ave., Mount Vernon, N. Y., will send you a base and holding tool free.

FROM HOLLAND comes word that N. V. National Steel Co. of Helmond is making collapsible packing cases—part wood, part steel. Collapsed volume is one-seventh erected volume. No nails, yet they last years.

SOF-RAP FITS THE SHAPE of your product. Won't tear, no matter how sharp the corners. Used for flotation wrapping, blocking or bracing, surface protection, or absorbent packing. It's made by Nichols Paper Products Co., Green Bay, Wis. (See New Materials, page 262.)

FRICTION NOISES in bearings, pistons, gears, ratchets, cams, clutches, etc., can be spotted with an Elec-Detec. Anco Instrument Division, 4254 W. Arthington St., Chicago 24, makes the electronic stethoscope.

SAFETY AFTER SUNSET is provided by a 3-in.-diameter, plastic-covered "Scotchlite" reflector. It's for workers who are outside after dark. Cost, 39¢. Automotive Safety Device Co., 444 Asylum St., Hartford, Conn.

DRY-PROCESS DUPLICATING system developed by Magna-Crest Corp. turns out dry copies in 15 seconds. Write to company at 730 Fifth Ave., New York 19, for a step-by-step description of the process.

BOOKLET OF THE MONTH comes from Eutectic Welding Alloys Corp. It has over 100 pages of well-illustrated technical data on maintenance and repair welding problems and procedures. Wire Dept. "F," 40-40 172nd St., Flushing, N. Y. Eutectic will send you one for free.

ENOUGH IRON AND STEEL SCRAP for 2100 tanks was shipped to steel mills between May and August by Du Pont. How much can you ship?

NEW LOCK BOLT weighs 50% less than same-sized bolt and nut with comparable strength. Pin's inserted from one side, collar from the other. A pneumatic tool does the rest. Cherry Rivet Co., Winston Ave., Los Angeles 13.

Factory Executives

"DEFENSE IN SPACE"—the Los Angeles Chamber of Commerce's new bait for defense plants—says there's room in L.A. County for New York, Chicago, Philadelphia, Detroit, Boston, Cleveland, St. Louis, Minneapolis, Dallas, Seattle, Kansas City, Atlanta, Pittsburgh—plus Los Angeles—"and then some." (Sounds like Texas.)

LOW-COST UTILITY FLOORING—Accotred—has high resistance to solvents and grease, high flexibility. Comes in red only, in 36- and 72-in. widths. It's a rubber-like coating on an asphalt-saturated base. Armstrong Cork Co., Lancaster, Pa., will tell you all about it.

CUSTOMERS WERE STUDENTS at Builders Iron Foundry's 5-day course in foundry practice and casting design. There's already a waiting list for next year. The foundry is in Providence, R. I.

SPLICING STEEL CABLE CONVEYOR BELTING with B. F. Goodrich's new method puts cables under equal tension during vulcanization. You get straight splices, trouble free. Make the splice with only two special tools. Goodrich (in Akron) will tell you all about it.

MAYBE YOU CAN CUT REJECTS if your handling equipment is rubber-coated. Automotive Rubber Co. doesn't make anything. But they know how to apply natural or synthetic rubber to your equipment. They'll answer questions at 8601 Epworth Blvd., Detroit 4.

GOT HEAT-TREATING PROBLEMS? Maybe Carpenter Steel Co.'s 5x11-in. slidechart has the answers you need. It'll tell you the right heating speeds, furnace temperatures and atmospheres, temperature, and time for drawing. Address the company at Reading, Pa.

DECIMAL EQUIVALENT DECALS—6 x 4¼ inches—can be put on slide rules, T-squares, drawing boards, desk tops. Equivalents are in 64ths. The Meyercord Co., 5323 W. Lake St., Chicago 44, will send them free.

SLIDERULE OF THE MONTH is a beam-load indicator, for those of you using Unistrut metal framing. Tells you weight that can be supported under varying conditions of span and unbraced height. Free from Unistrut Products Co., 1013 W. Washington Blvd., Chicago 7.

TEMP-ALARM is a new heat-sensitive paint you can brush or spray-apply on bare metal or painted surfaces. Changes color at a given temperature. Comes in five types—each with a different change-temperature. Price $25 to $40 per gallon from Tempil Corp., 132 W. 22nd St., New York 11.

YOU MAY GET BETTER QUALITY CASTINGS at lower finishing costs with the "C" (phenolic resin) process for foundry molds. It cuts sand use 90%. A 3¢ stamp will bring details from Bakelite, 330 Madison Ave., New York 17. (Borden is another supplier of the resins and know-how. See page 234.)

By ROBERT A. DILLEY • Field Editor, FACTORY

If You Really Want to Keep Your Air Clean . . .

THIRTY-TWO SPECIAL AIR HANDLING SYSTEMS move 4070 tons of air each 8-hr. shift to remove dust and fumes from Ford's transmission plant, Cincinnati. That, of course, is in addition to the plant's master air circulating system, which supplies the entire plant with fresh air the year around.

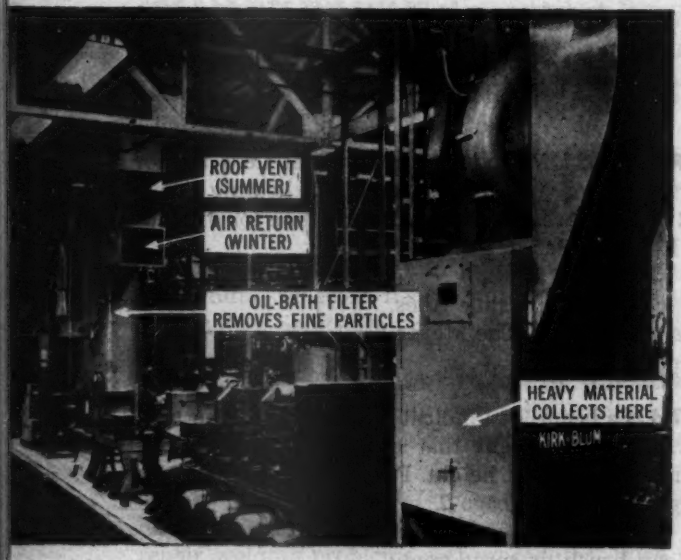
As return on its investment to do this big air-handling job, Ford tallies up these five important benefits:

1. Working conditions are good. Air analyses show purity of air in the plant is exceptional for this type of metalworking facility. And clean air is a valuable selling point when recruiting new employees.

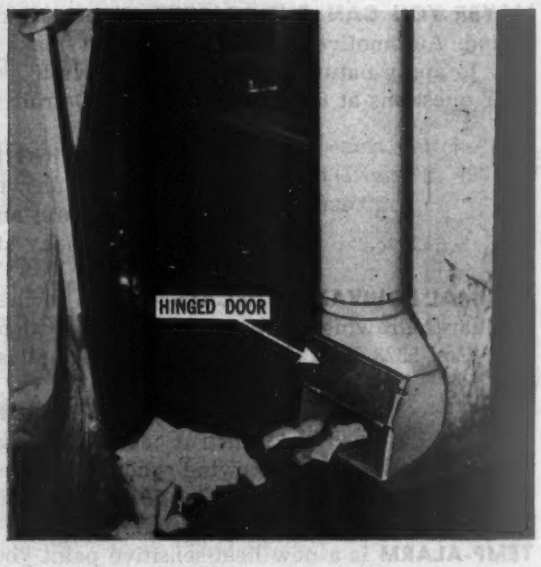
2. Damage to metalworking machines is reduced. Air-borne particles of abrasive matter settling on critical machine surfaces can increase machine downtime and maintenance. Ford feels its equipment is now well protected, so lower equipment maintenance costs are expected.

3. Less plant maintenance will be needed. It's too early to be sure, but Ford officials believe the fume- and dust-control systems will make for less painting and cleaning. That goes for walls, structural members, and lighting fixtures, as well as general plant and production equipment. (And,

. . . HERE ARE FOUR IDEAS FOR DUST



1 AT LARGE TRANSFER-TYPE MACHINE . . . cast-iron dust from various operations is collected by individual ducts and fed through dynamic precipitators and after-cleaners. Dust-laden air enters at the top. As it passes the long-radius elbow, heavy material drops to the collector. The air, which now carries only fine material, is then fed into an oil-bath filter. Cleaned air can be either vented through the roof (summer) or returned to the plant (winter.)



2 AT THE MAINTENANCE SHOP . . . dirt pick-up stations are mounted on columns. As floor sweeper collects a quantity of refuse, he lifts the door of the air scoop and sweeps the refuse into it. Refuse flows up the duct to the collector in the woodworking shop. It's a simple way to dispose of floor sweepings and Ford finds it encourages cleanliness in the shop. There are no refuse boxes parked here and there about the plant. Dirt is whisked out of sight.

as you'll see, good housekeeping is built right into the system.) Add all this up, and it makes for a big potential saving.

4. The community is protected. Fumes are vented through the roof, but most are non-toxic. In any event, the dilution of fumes in the air is so great that there is no chance of affecting the community. Dust, chips, etc., are removed from air before it goes through the roof (in the summer). In the winter, most of this air is recirculated in the plant.

5. Product quality is protected. Dependability of the Ford-o-matic and Merc-o-matic transmissions built in this plant hinges on successful functioning of many intricate valves. So engineers figured it just wasn't smart business to build them in any but a clean atmosphere. Proof of the effectiveness of the many fume- and dust-control systems: Oil filters on final test machines turn up a minimum of foreign particles.

Maintenance of the 32 separate control systems does not appear to offer any substantial problems. Most hoods and ducts are made from 14- to 20-gage black iron. At one or two points galvanized iron has been used. There are no aluminum or non-metallic ducts in the plant. Little in the way of active acids is carried through the pipes or released into the air, so ducts are expected to last a long time with little maintenance.

Cleaning of dynamic precipitators and filters is only an occasional operation. Gages on the precipitators tell when they should be cleaned.

A centralized system for collecting dust and fumes might have cost a little less, but it would have put a limitation on the production layout of the plant. The present system is tailored to the layout, and will not hinder any future changes.

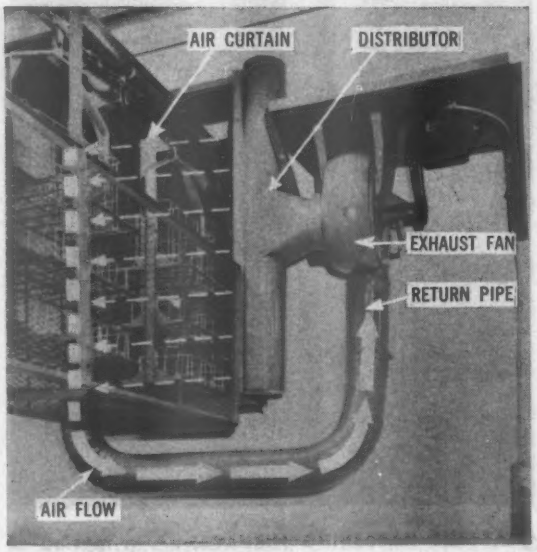
Each of the 32 systems has its own centrifugal fan. And to reduce the possibility of future difficulty, heavy-duty material-handling fans were specified for the heat-treat areas. This extra investment (instead of lighter-weight ventilating fans) is expected to produce longer life and lower maintenance cost.

To anyone visiting the transmission plant, as I did, perhaps the most interesting thing about the dust and fume systems is the specially designed and fitted hoods and ducts. They've been tailored to the equipment they serve, and function as close to the source of contaminants as possible.

We took several photographs to show you some of the typical installations—how they look and what they do.

CONTROL AND REMOVAL

Turn the page ⟶



3 AT CONVEYOR ENTRANCE . . . this unit produces an air curtain which prevents plant air from entering final assembly area. Four of these systems guard conveyor slots. In addition, conditioned air in the assembly area is maintained at a slight pressure so air flow is out from that area rather than into it. Functioning of this air-seal unit is simple. Exhaust fan and distributor force air across the opening. It then returns through duct below conveyor.

4 AT TOOL GRINDING AREA . . . each of 27 dust-producing machines is equipped with a collecting hood. These hoods are mounted on flexible duct where permanent ducts would interfere with normal machine operation. Ducts from each machine converge into a header in the trusses. The header ends at a bank of two oil-type dust collectors. The entire collection unit is mounted on a platform under the roof. Air can be vented through roof, if desired.

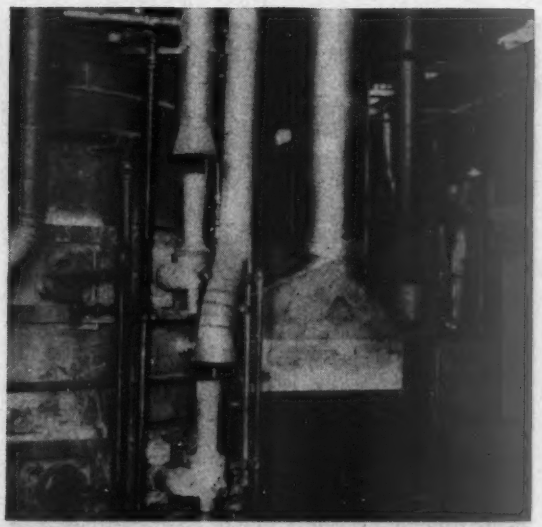
Begins on page 88

IF YOU REALLY WANT TO KEEP YOUR AIR CLEAN . . .

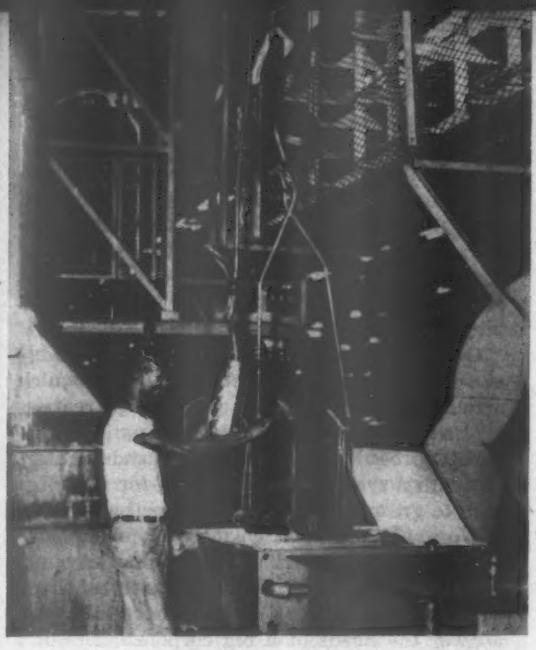
1 AT SMALL BATCH FURNACES . . . application of two simple local hoods on each furnace removes products of combustion before they can contaminate the air. At the exit doors of the furnaces, square hoods catch escaping vapors as the doors are raised. Above furnaces are small hoods for burner exhaust.

. . . HERE ARE SEVEN IDEAS FOR SMOKE

4 IN THE MAINTENANCE WELDING SHOP . . . hoods remove smoke and fumes from smith's forge and welding tables. Design of the hood above welding table at right permits work at bench level or on objects of considerable size. In either case, chamfered opening causes smoke and fumes to be carried away from the welder below his breathing level. Dampers in each duct permit balancing of the system so that removal of fumes is uniform. Fumes are vented through the roof. Ventilating system supplies make-up air.



5 AT THE HARDENING FURNACES . . . a myriad of hoods and ducts have been installed to pick up fumes and burning wastes. Small funnel-shaped collectors are mounted just above the burner stacks on the rotary furnace at left. The batch-type furnaces at right are fitted with hoods and ducts at all points where fumes or smoke might escape. Despite the considerable amount of smoke- and carbo-nitride-fume-producing equipment in the department, the air is clean and cool. Furnaces operate at temperatures above 1500 F. Heat treat odors are missing, too.

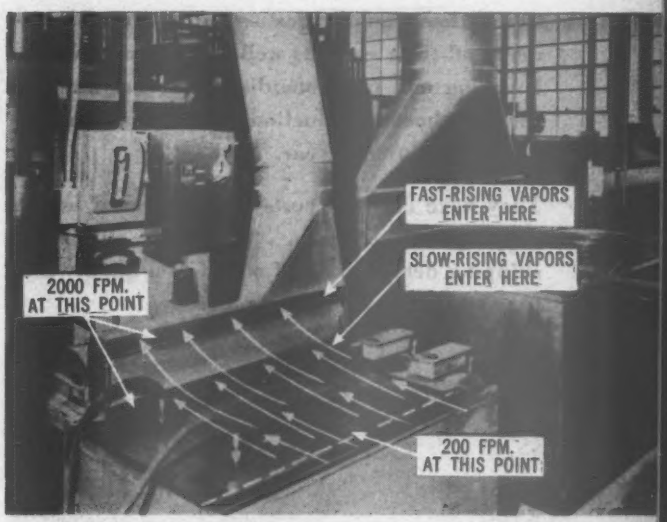


2 AT THE PARKO-LUBRITE OPERATION . . . four solution and rinse tanks are equipped with hoods to draw fumes away from the operator. The hoods at right are curved to fit below the overhead conveyor. Common fan unit mounted in the trusses forces collected air out through stacks in the roof.

3 AT ELECTRIC INDUCTION HARDENING . . . an enclosure hood protects operator from gases or fumes liberated during the process. Most vapors are released during the quench cycles of the two-unit hardening machine. Harmless vapors are vented through the roof.

AND FUME CONTROL AND REMOVAL

6 AT THE OIL QUENCH TANK . . . hot gears and parts are dipped in oil. Heavy fumes, some flames are given off. The ¼-in. steel plate hood fits just over the tank and has its own exhaust fan and stack. A large volume of air is sucked from above into the channel around the inside diameter of the hood. (The airflow pattern is like an inverted funnel.) Rising fumes are also drawn into the channel. The funnel-shaped air curtain prevents fumes from rising to reach the operator. Design gives workmen a clear view of the tank.



7 AT THE HEAT-TREAT DEPARTMENT . . . fumes from water and oil quench tanks are drawn into horizontal air curtain moving from the front to the back of the tanks. It's all kept below the breathing level. Vapors which rise quickest are sucked into the upper slot. Those which rise slowly or which originate close to the back of the tank move into the lower slot. Velocity of the air in the curtain is about 200 feet per minute at the front of the tank and 2000 feet per minute at the slots. These speeds are greatly in excess of usual air speeds.

HOW TO GET A HEAD START WITH...

...A Simple Cost Control System

By JAMES T. DUFFY, JR. • President
The Riverside Metal Company
Riverside, N. J.

Our foremen run their departments as if they owned them. That's because they thoroughly understand their costs as well as their operations. Knowing and understanding costs has enabled them to boost production performance nearly 30% in less than a year.

They have cut unit costs . . . improved housekeeping and safety . . . practically eliminated shipping delays . . . and added to a quality performance that was already excellent.

WE HAD GROWN BEYOND one-man cost control. Keeping costs in line had to be a shared responsibility. We needed decentralized policing of budget details—under policy supervision only. I believe many small and medium-size plants could reap benefits if they'd further share this responsibility. In our case we asked our foremen to help shoulder the load—and they did it well.

Our foremen had no experience with a budget or cost control system. And we needed quick action. Text books and accounting treatises all had answers, but we shied away from intricate procedures. We felt we should start out with a system simple enough for the foreman to grasp readily and use effectively.

We explained what we wanted to our controller, a capable and understanding accountant. He came up with a "budget forecast plan" that's been a boon to us. Of course it won't answer the needs of a big corporation. But I believe it can help a small business that doesn't have good cost control.

The plan was easy to install, too. We put it into effect the month after we had agreed upon its design. And it started working successfully right away, without our spending a lot of extra training time.

Here's how it works

About the middle of each month our production manager checks the latest order situation with the sales department. Also, he must check for compliance with government regulation of critical materials. Then he makes up a final estimate of production requirements for the following month. Since we're working with metal he figures the production forecast on a gross net and net-daily basis for each of the 11 operating departments.

The production manager sends the departmental production forecasts to the accounting department. In one day, one girl calculates the budgets for all departments for the month following.

First, she recaps each department's production and actual costs for the second and third preceding months. Actual costs include these accounts: direct and indirect labor, supplies, repairs, fuel, power, and scrap loss. Then she calculates the forecast budget by ratio with the actual figures for those two months. It's as simple as this:

$$\frac{\text{75\% × actual cost for 2nd and 3rd preceding months}}{\text{Budget allowance for next month}} = \frac{\text{Actual production for 2nd and 3rd preceding months}}{\text{Forecast production for next month}}$$

We use 75% of past performance as the base because we believe it better stimulates improvement. It equals 100% in some systems.

We use the changing base months instead of a fixed period for cost budgets. That takes care of methods as well as price changes.

Near the end of each month I have a meeting with the plant management group. We distribute and discuss the budgets for the coming month and the previous month's results.

The budget figures are based on actual production for that month. Also added to the reports are lost-time injury cases (if any), department cleanliness rating, and a factor we call "efficiency."

Lost-time injuries are expressed as a percent performance figure. Starting with 75% as perfect, we deduct lost-time hours per 10,000 hours worked. But we don't penalize beyond 30 days lost time for one case.

Cleanliness is rated by an employee committee during an unannounced monthly survey. They examine each department and rate its housekeeping percentage-wise. The percent efficiency is a top management evaluation of each department supervisor's personal effort. It includes such factors as cooperation, initiative, personnel relations, and suggestions.

The over-all performance of each department is an average of all the performances on measured factors—as shown at right.

We talk about the differences between actual and budget costs, try to help each other correct weak spots. Then comes the high spot of the meeting. We award $100 to the department with the best performance for the month.

Improvements to come

We know this plan doesn't measure management's performance perfectly. But everyone understands it. And uses it—to boost performance. The proof is in the 30% improvement. If you could see how our foremen keep track of daily expense and compare it with the budget, you'd be convinced. And if you could hear the way they talk about costs, you'd be convinced.

The foremen know where they stand. They have a tool to gage their accomplishments. They have top management's clearly stated expectations for the month ahead. They're interested because they understand the system thoroughly. It certainly has improved mutual understanding.

As the foremen understand costs better, they're making more constructive suggestions. When they get to the point of wanting major refinements they can handle, that will be the time to add complexity.

Some day, we'll probably have a real standard cost system. When we do, we believe our foremen will understand it and use it. They will have had training and experience in cost control fundamentals.

Reports for Meeting of December 28

	Forecast for January	Actual for November
Pounds melted	754,500	755,500
Pounds production	701,200	703,400
Controllable expense:		
Indirect labor and salaries		
Supervision	$1,199	
Miscellaneous labor	2,692	
Overtime premium	406	
Shift premium	101	
	$4,398	89.7%
Supplies and expenses		
lubricants, etc.	$1,003	
Repairs	2,928	
Gas	None	
Power	3,797	
	$7,728	91.8%
Total controllable	$12,126	—
Fixed and semi-controllable	$ 2,465	—
Scrap allowance	7%	70.4%
Direct labor—$	$13,215	—
Direct labor—hrs.	6,043	73.4%
Indirect labor—hrs.	1,524	—
Cleanliness		85.0%
Safety		75.0%
Efficiency		88.0%
Total		81.9%

RECRUITING METHOD	VOLUME		QUALITY		RELATIVE COST (Newspapers = 100%)	
	Number Applicants Attracted	Number Applicants Hired	Ratio of Applicants Attracted to Applicants Hired	% of Hires Retained to Date	Cost per Applicant Attracted	Cost per Applicant Hired
NEWSPAPER ADVERTISING	5701	422	1—16	74.6%	100%	100%
RADIO PROGRAM	250	19	1—12.5	84.2	521%	508%
TELEVISION PROGRAM	464	68	1—6.9	83.8	662%	334%
POST CARD CAMPAIGN	27	4	1—7	75.0	66%	31%
EMPLOYEE RECRUITING CAMPAIGN	296	164	1—1.8	85.9	31%	4%
MISCELLANEOUS	1494	378	1—3.9	74.6	...	...
TOTAL	8232	1055	1—7.8	77.1		

METHODS AND RESULTS · The chart shows you how our recruiting methods stack up as to volume, quality and cost. But the bare numbers aren't the whole story. Below are descriptions of our various methods, and some conclusions about each, in the order in which we began to use them.

BRAND NEW—A PRACTICAL EVALUATION OF

5 Ways to Get Workers in a Tight Labor Market

By PAUL E. BLACK • Director of Industrial Relations
Cleveland Pneumatic Tool Company, Cleveland

OUR COMPANY is in a tight labor market. So tight that recruiting new employees is tougher than it was in World War II. Then we often had trouble keeping people away from the employment manager's door. And we got good help from the State Employment Service (later USES) and from newspaper advertisements. This time, USES has been looking for people to place, and newspaper advertisements weren't bringing in enough applicants.

The result: We had to expand our recruiting program greatly. In the past 10 months we have interviewed 8232 applicants, hired 1055, and kept 814 (about 80%) of them.

That's a lot of interviewing and hiring. And, since we kept close track of results and costs, we've learned a lot about how our different recruiting methods compare.

1. NEWSPAPER ADVERTISING · Our approach is simple. We use classified advertising, tell people where our plant is, and what help we need.

We make the ads as big as good taste suggests, and change our copy often. A typical ad will list as many as 20 types of jobs.

Normally we advertise within a radius of 75

miles of the plant. We go further afield only for special reasons, such as when a plant in a nearby city curtails production, thereby throwing employees on the labor market.

Newspapers produce by all odds the largest number of applicants. But, as you can see in the chart, we have to do a lot of interviewing (16 persons) to hire one. That adds an additional "hidden" cost, since it loads up our employment office, and requires us to hire more interviewers, to get satisfactory workers. This cost is not shown in the chart figures.

Our big job is to improve the quality of applicants who respond to newspaper advertising without cutting down too much on the volume of response. We're working on this constantly.

2. RADIO PROGRAMS · In looking for a program, we have two aims. Besides attracting job applicants, we wanted to render a useful public service. And we wanted our employees to take part in and benefit from the project.

We finally picked a 15-minute news broadcast, heard five times weekly over station WHK. The commercial includes tape-recorded employee interviews, made in the plant. The station's news director talks to employees right on their jobs. We're after spontaneous interviews, so employees get no scripts. They're told to say exactly what they feel like saying. We also play each recording back to the employee a few minutes after he makes it.

This recruiting method has a double-barreled potential, we have found. Our employees are proud of the program, and want very much to be a part of it.

You'll notice in the chart that radio is the most costly recruiting medium. It's also a low-volume producer. So why not cut it out? Part of the answer is this:

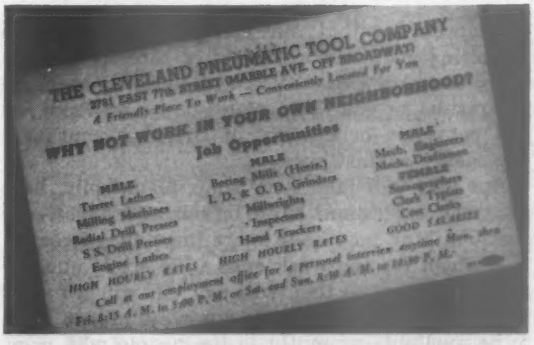
Radio makes an important contribution to our employee relations picture—and does a fine public relations job, too. Further, we know that radio, like television, combines with other recruiting media to produce an over-all impact that one method alone doesn't produce. So we think it is well worth what it costs.

3. TELEVISION PROGRAMS · We've tried several programs since we first went into television in November 1950. With our present show—Pat Patterson's All-Outdoors-Club—we think we have a fine audience at 1:30 each Sunday afternoon. A veteran sportsman handles the show, and he lets people know in his travels that Cleveland Pneumatic Tool Company is a good place to work, and that lots of fine jobs are waiting to be filled. For top effectiveness, we've changed the name to Cleveland Pneumatic's All-Outdoors Club.

On this program, questions from viewers are answered. After the first show, 544 questions came in. Prizes (which we don't have to pay for) are given away on the program, too.

What about programs like this? Good for recruiting? From the figures, it would seem that they are not.

But television, like radio, has supplementary values that make it worth while in a tight labor market. And, because we have analyzed the costs, we feel at least that we know fairly well where our money is being spent, and for what. If the time comes when we feel the benefits are no longer worth the known costs per applicant attracted and hired, we can stop.



4. POST CARD CAMPAIGN · This campaign was directed to people within a 4-mile radius of the plant. We told about jobs right close to home and asked applicants to drop in to see us—on Saturdays and Sundays if they wished.

A total of about 18,000 cards were mailed, in batches of 1000. A local mailing service printed

the cards and did the mailings. We picked the master area and the zones we wanted covered in each mailing.

As people are released from consumer-industry jobs, we hope they will remember the cards they got from us. We may re-instate this program (now over) but have no definite plans right now.

The results of the post card campaign are not impressive. The costs are low, but the volume of applicants is, too. Certainly we could never justify the method on the basis of the number who said they applied directly as the result of the cards.

But we still think the campaign was worthwhile on the grounds of improved community relations. Like radio and television, we're sure we're getting collateral but hard-to-measure benefits from the card campaign.

5. EMPLOYEE RECRUITING PLAN • This is a relatively new approach for us, based on the reward principle. We invite present employees to bring in (or send) job applicants to the employment office.

For each applicant hired and kept for 30 days, we pay the employee responsible $5. If the new employee stays for six months, the "sponsor" gets a $25 Defense Bond. And if a sponsor brings in five people who stay six months, he gets a further reward of a $100 bond.

To keep the plan going, we have a big bulletin board right beside the time clocks. Here we post the names of employees who have received awards.

To keep track of referrals, we use a printed card that the employee gives to the applicant. We also post plant notices occasionally, telling how to get a new supply of recruiting cards. And all members of the personnel department who travel through the plant carry a supply, as does the guard at the main factory entrance.

The record shows that this program is by far the most effective on an all-around basis. It's even better than the totals in the chart on page 94 suggest. That's because we started the plan later than some of the others. For example, from May through September, we hired 210 people who said they came in because of newspaper advertising. In the same period, we hired 164 people referred by employees. This despite the fact that the volume of employee referrals wasn't high (only 296 total). The reason: exceptionally good quality.

Our employees are uncanny at picking good applicants to refer. This is further evidenced by the fact that new workers hired from this source have had the lowest turnover of all the groups.

In the future, we will place all possible emphasis on the employee recruiting plan as our best single source of new workers. We realize we still don't have the full cost picture on this approach, but that doesn't worry us. We know that as we begin to pay more $25 and $100 awards it will be because we're getting good workers in good volume.

6. MISCELLANEOUS SOURCE • You will notice in the chart (page 94) that 1494 applicants can't be spotted as having been attracted by any *one* of our five basic recruiting methods. Some applicants come in as the result of the *combined* effects of two or more recruiting drives. Upon questioning, many applicants admit to having read our ads, heard our radio program, and seen our TV shows, but can't say which one medium brought them to us. Nevertheless, if we hadn't achieved saturation by the use of all media, those applicants would probably have applied somewhere else—not here.

HINTS ON HOW TO IMPROVE RECRUITING

Chances are that our comparative figures on recruiting methods won't apply directly to any other company's case. You can certainly measure the results in your own plant, however. And you can get some benefit out of checking your own experience against ours.

But that will take some time. Meanwhile, here are some suggestions based on our own experience that we think may be of more immediate help:

1. Shoot for the week ends • We select our advertising times so they will pay off, which means heavy week-end coverage. But we find you have to be available promptly to the people who want to apply in response to such advertising. Result: We have opened our employment office on Saturday and Sunday mornings.

2. Get professional help • Radio, TV, and area-wide mailings were all new to us. So we got help. Our advertising agency already had or could get quickly a lot of helpful answers to our questions.

3. Make your efforts personal • There seems to be no substitute for personal effort in recruiting. That's why, we think, the employee recruiting plan is so successful.

4. Encourage employee participation • It's obvious in the employee-recruiting plan, of course. But we also have our tape-recorded employee interviews for the radio program. And we have arranged to have some of our employees as guests on the television All-Outdoors Program.

5. Have a training program • It's essential for us. We give fully 70% of the machine operators we hire some sort of in-plant training.

6. Keep an eye on the young people • In this period, some young people are quitting school to take high paying factory jobs. Others sit and wait to be drafted. To get a supply of well-trained youngsters, we feel we'd like to keep them at their studies. So we're working with vocational school authorities on a cooperative program.

Our Defense Program Faces a Crisis

A major crisis will soon confront our defense program.

It is not a crisis in raw materials. To find enough materials, from steel to cobalt, for defense production is a serious problem. But it is one that is being solved.

It is not a crisis in manpower. Shortages of workers with special skills hamper production, but these shortages are being relieved, slowly.

It is not a crisis in manufacturing capacity. American industry's record-breaking expansion is, with very few exceptions, keeping abreast of defense needs.

The coming crisis will be one of finance. It will rise from our failure to provide the means to PAY FOR the defense program we now have under way.

A $15 Billion Deficit?

Congress has approved a defense program which is scheduled to raise *total* federal spending in the year from June, 1952, to June, 1953, to somewhere between $85 and $90 billion. Additional appropriations for more air power and atomic development, which are now proposed, would add several billion dollars.

But Congress has not approved a tax plan to match such spending. With the new levies enacted in this session, tax collections during the 1952-53 fiscal year are estimated to fall somewhere between $70 and $75 billion. That would be roughly $15 billion short of balancing the budget. If the defense program is expanded, the deficit will be that much greater.

We have not yet felt the impact of the crisis that would accompany a federal deficit of this magnitude. Federal tax collections currently are big enough to balance federal expenditures. But the defense program is scheduled to boost the annual rate of federal expenditures $25 billion in the next year.

To Meet the Crisis

By January the crisis will be clearly in sight.

Then the President will present his budget. After that, Congress must act to close the broad gap between government income and government spending. If it fails to do that, the whole defense program will be menaced by weakness in its financial foundations. That weakness might well take the form of another destructive wave of inflation.

We have three ways to meet this crisis.

The best approach, of course, is to cut unessential expenditures. That can make a real dent in the deficit. The second is to collect more

taxes. The third, and by all odds the most dangerous, is to have the federal government meet its deficit by going deeper into debt. Borrowing, which might feed inflation, can easily lead to disaster.

Near Income Tax Limits

It will not be possible to raise taxes to meet the deficit merely by increasing further the rates on corporations and on persons in the upper income brackets. Congress has about scraped the bottom of that barrel.

The Senate Finance Committee said as much in reporting this year's tax bill. The Committee reported that it had "serious doubts as to the feasibility of raising any substantial additional amounts of revenue from income tax sources." The Committee observed that recent tax legislation brings the burdens of most corporate and individual income taxpayers close to the World War II peaks, and actually carries the rates paid by many taxpayers above those peaks.

Our ramshackle federal tax system must be thoroughly overhauled in order to broaden the tax base if it is to produce more revenue—without doing much more harm than good.

The shocking fact is that no one seems ready to act along any line that might enable us to surmount the crisis.

That fact of itself aggravates the coming crisis. And next year's presidential election doesn't make it any easier to move effectively. Both parties will shrink even more than normally from backing any program that might irritate any considerable number of voters.

If we are to meet this crisis on the tax front in an orderly way, the technical work should be in progress right now. To a large extent it is being ignored.

If we are to enforce the vitally essential program of government economy, there is the same urgent need to get under way the spade work that is required.

And if—as a last miserable expedient—we decide to let the federal government drift deeper into debt, it must have a well-developed program of borrowing from individuals and other investors, such as insurance companies, rather than from the commercial banks. Borrowing from commercial banks might speedily translate the deficit into more and more price inflation. No adequate program of borrowing from savings is now in sight.

Now Is the Time

It is possible, of course, that international relations may improve sufficiently to make it safe for us to slow down the rearmament program. If that should happen, the fiscal crisis would not be so critical. But that kind of good fortune has been notably absent in recent years.

Lenin, patron saint of Communism, is quoted to the effect that to destroy a political and social system such as ours "you must debauch its money."

We shall set democracy to digging its own grave if, through our preoccupation with politics during the presidential campaign, we pave the way for further debauchery of our money.

If we really want to avert that disaster, now is the time for us to get going.

Once the crisis is full upon us, it will be too late.

McGraw-Hill Publishing Company, Inc.

"It sounds awful corny," mused old Tom.

Old Tom Callahan's Christmas Present

By RAY W. SHERMAN
ILLUSTRATED By HOWARD WILLIAMSON

OLD TOM CALLAHAN, foreman in Department M-T, looked out the window of his tiny office and wondered how many of the men in Central Manufacturing had heeded wifely warning and worn their rubbers to work. For a messy December whiteness was sifting into the factory yard.

Fluorescence from the light above his desk silvered his heavy hair as he turned back to writing on a report sheet. Factory noise smothered footsteps in his doorway and he was unaware of the approach of Tobias Quint till his one-time shopmate perched himself on a corner of the desk.

"Hi, Tom!" The plant manager's eyes, set in a wrinkled leathery face, peered demandingly at the old foreman, who, without a word, drew a plug of tobacco from the big, flat, center drawer.

"You know, Toby—" Old Tom also handed a tobacco-stained knife to the plant manager. "I was just thinking about your Christmas present."

"Present? For me?"

"Sure!" The bulky foreman rumbled from his depths. "I've decided to give you a plug of tobacco—for your very own—to have and to chew forever. Then you won't have to bum chews off your foremen—till Little Christmas anyway."

"Don't be an ass!" Toby bull's-eyed the big gaboon. "I can't chew tobacco up there."

"Just the same—" a chuckle shook Old Tom's torso "—I think I'll send it up—with ribbons."

"And I could send—let's see—" Toby's wrinkles were working into a grin when the foreman poised an interrupting hand.

"You don't need to give me anything! Nobody needs to give me anything!"

"You mean you've had it?"

"Maybe I've still got it, Toby. I wouldn't say this to anyone else. It sounds awfully corny. Maybe I'm getting old—too fast."

"Both of us—I guess."

"When I was a kid in the old brick schoolhouse the reader had a story about a boy who said he didn't have much and some bimbo tried to tell him how rich he was with two eyes, two arms, and all that stuff. Sounded as though there was a trick in it some place. But—I dunno, Toby—I've been reading the papers. Sometimes I think I've got a lot."

"A lot of what?" Toby scored a near-miss.

Old Tom looked soberly up at the plant manager. "Toby," he said, "how many people in this world would give their eye teeth to live in this country? I'm here. And—nobody can put me out!"

"That's true—Tom."

"And you can howl it down if you want to but you'd have a heck of a time finding a better town to live in than Center City—with all its faults. The worst corn of all is that I've got a job with Central Manufacturing. Oh sure," Old Tom waved an arm, "it's a lousy outfit, I suppose. It's a heck of a way from the perfect job I once hoped I'd find. But—sometimes I think we ought to pass the hat at Christmas and give the Old Man—"

"Don't!" Toby raised a protesting palm. "He just had a sick spell. He isn't very strong."

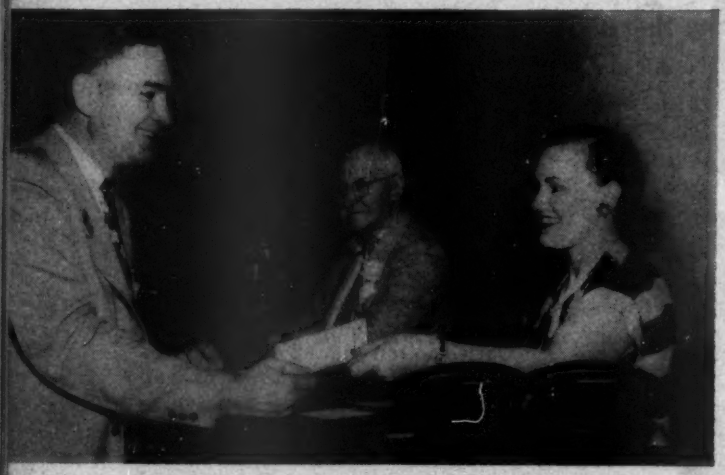
"Just the same, Toby—"

Then the telephone girl's "ding-ding . . . ding-ding" began and the plant manager reached for the foreman's phone, said OK, and hurried out the door.

Cash in your Scrap!

Scrap is often a safety hazard when you leave it laying around the plant. The steel mills need it.

OPERATING SHORTS



Visitors Get a Friendly Welcome

"I was quite impressed with the way Goodyear handles its visitors," wrote a visitor to Goodyear Tire & Rubber Company, Akron.

What impressed him was the combination of courtesy and efficiency. Official greeter Albert B. Cunningham—a young 87 years old—heads a staff of five who, as part of a courtesy-security program, conduct each visitor to his destination.

Visitors' passes are of multiform, continuous type, fed from a machine mounted flush with the receptionist's desk. The machine is on a turntable, so the visitor can sign his pass easily. Numbered carbons are filed.

1 Man + Pushbuttons = 12 Men

One man sorts, stacks, and automatically counts up to 1200 boxes per hour by pushbutton, at Goleta Lemon Assn., Goleta, Calif. It took 11 or 12 men to do the job manually.

As the boxes of lemons roll past on a live roller conveyor, the operator notes lemon color (degree of ripeness) and pushes one of six buttons, corresponding to the classifications. The appropriate hydraulic stacker then lifts box from conveyor, puts it in stack.

When stack is 11 boxes high, stacker automatically moves it to the front and sets it down on floor track, positioning two stacks together for truck removal.

Induction Heating Salvages Metal

Induction heating has solved a tricky problem at Sponge Rubber Products Company, Shelton, Conn. It is being used to reclaim metal strips from rejected weather stripping.

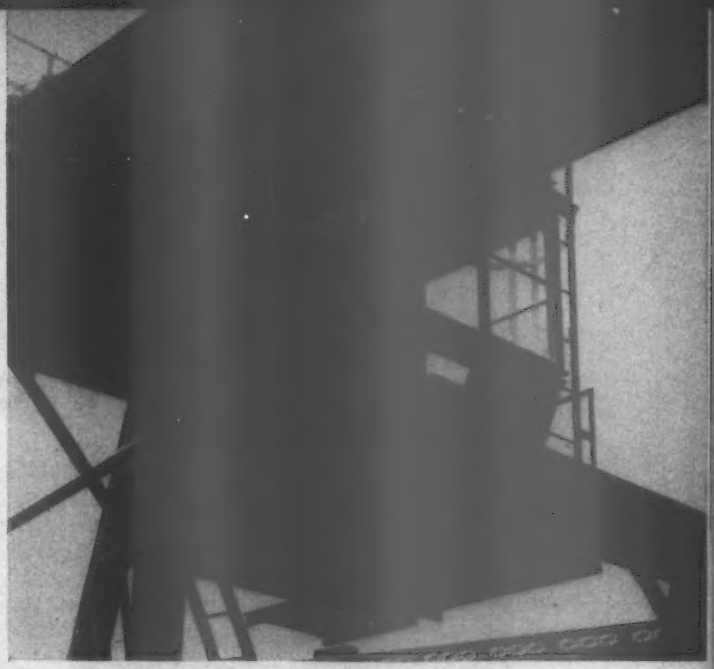
The operator places the weather stripping on the canvas belt, metal side up, and passes it through the heater. The metal is heated enough to loosen the bond with the rubber; the rubber insulates the belt.

The new equipment paid for itself in the first month of operation.

Slanted Window Helps Crane Operator

A slanted window at floor level lets the operator see what's under the crane—without craning his neck. The cab of this new crane at the Lehigh Structural Steel Company, Allentown, Pa., has a window where many cranes have a blind spot. The window is 20 degrees off the vertical, has double-strength window glass panes.

This idea is adaptable to older crane cabs, too, where extra visibility would help—and if the protection of steel plate isn't necessaary.



Displays and Tips Help Engineers

Every two or three weeks Boeing Airplane Company, Seattle, prepares a display of recent developments in manufacturing processes. The displays are rotated among the various engineering areas.

With each display go mimeographed tip sheets for the engineers, which describe the process in detail, point out advantages and limitations.

Displays cover such subjects as forging, sealing design, bearing retention, insulation. They supplement the manual, keep engineers up to date.

"Shoeshining" Paint Onto Hard Spots

Problem: Painting the back of radiator tubes on electrical equipment at Westinghouse Electric Corporation. Lack of space to maneuver the spray gun caused waste of paint and time, and an incomplete coating.

Solution: Use a strip of rubber gasket material—similar to inner-tube rubber. Dip the strip in paint, wipe the paint on the backs of the tubes.

Benefits: The "shoeshine" method gives backs of tubes an even coat, saves time and paint.

CASES IN METHODS IMPROVEMENT

JACK & HEINTZ, INC., CLEVELAND

10 Ways to Trim Costs and Boost Profits

JACK & HEINTZ, INC. (as the company's now called) came through the war with a sensational production record—plus the reputation for ultra-liberal management. After the war orders dropped off and costs mounted. Big profits became big losses.

Still available to management was a well-trained group of "associates"—the company's name for its employees. Their jobs were at stake. Management started to rebuild.

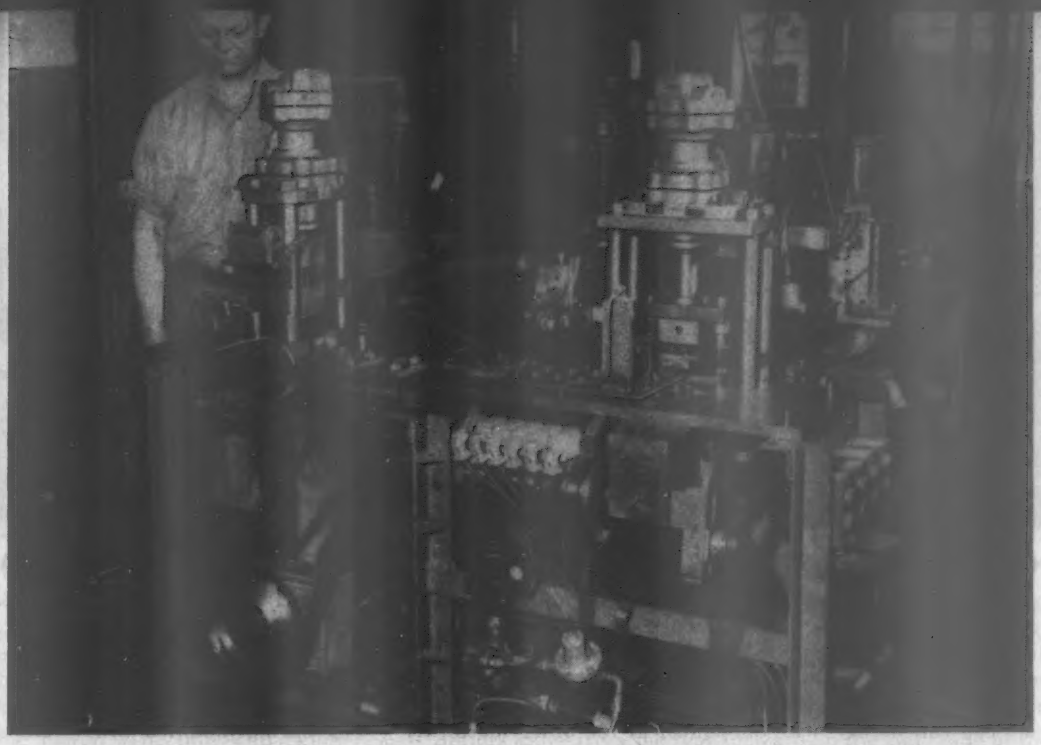
Now Jack & Heintz is showing a modest profit. Again the company is proving itself to be a real factor in industry.

Many of the methods improvements shown on these four pages originated with hourly-rated employees. Others are the work of the foremen and specialists. All the improvements are helping Jack & Heintz do a better job for itself and for its employees.

1 SAMPLE BOARD HELPS IMPROVE QUALITY CONTROL

To pass inspection, parts must be burred properly. There are so many parts in process at Jack & Heintz that burring department employees benefit by consulting the display board in their department. Each sample posted is properly burred. When an employee has a question on burring a part, he can check the board and get the answer.

And the board's also used for training. When a new employee comes in to the burring department, inspectors go over the board with him and explain each different burring operation. And, as shown here, the inspector encourages new employees to use the board until they are experienced on all burred parts. The board is also helpful to regular employees transferred temporarily into the burring department. It gets them off on the right foot.



2 AUTOMATIC MACHINE COMBINES FIVE HAND OPERATIONS

This machine makes "hairpins." That's what motor manufacturers call copper conductor bars after they've been cut to length and given a 180-deg. bend in the middle. The machine now makes four sizes of hairpins—can make a dozen. Only rectangular wire is used —no round wire.

An automatic de-reeler feeds the lacquered wire to the machine. It first passes through straightening rollers. Then some of the insulation is stripped by an air broach. Next, a traveling air clamp feeds the wire to a hydraulic unit that cuts and chamfers it.

A grab link grasps the cut wire in the middle and draws it through shaping dies. A hydraulic press then flattens the crimp. A motorized bristle brush ejects the hairpins.

Hairpins used to be made by hand—three pins a minute. Now they fly out of the machine 30 a minute. And pins are more uniform. They need less time in final assembly. There are fewer rejects.

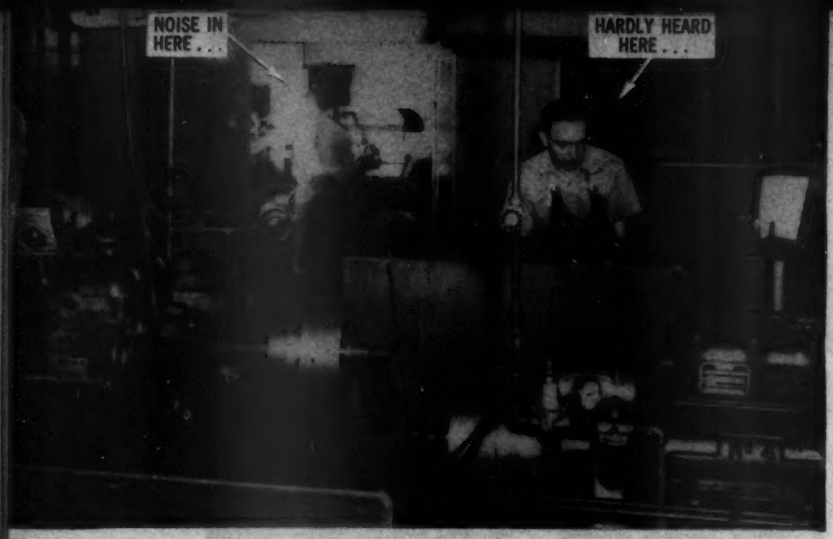
3 DRILLS 42 HOLES EVERY FIVE MINUTES

A 10-head, radial-spindle, semi-automatic drilling machine does in 5 minutes a job that used to take 35 minutes—drilling 42 holes in a flanged cylinder. It's a methods improvement submitted by a Jack & Heintz employee.

The flanged cylinder is locked in the jig and the drilling cycle is selected. Then, hydraulically-operated drill heads move toward the center. In six cycles, 12 1¼-in. holes, 6 ⅛-in. holes, and 24 13/32-in. holes are drilled. Circuits are electronically interlocked with automatic drilling at different index positions.

At present this machine does work on two such parts. But head and drives are easily changed for new setups. At current production rate, only eight months will be needed for this machine to pay for itself and start turning in a profit.

More on next page



4 BOOTH MUFFLES LATHE SQUEAL

Right in the middle of 30-odd turret lathes is one lathe housed in a plywood booth. This lathe does all work on extrusions, which, when turned, emit a high-pitched squeal. The other men in the department complained about the noise until the booth was put up.

When the lathe has been loaded and started up, the booth door is closed. You can hardly hear the squeal at the other machines. Complaints have ceased. Absenteeism has dropped. The quality of the whole department has gone up.

Inside the booth are fluorescent lights, mounted flush to the acoustical ceiling. A blower moves air through the booth. The operator wears ear plugs, stays in the booth during operation.

5 MOTORS ARE TESTED ON A

Instead of a test rack, Jack & Heintz uses this testing conveyor. Motors move along it as they run-in at full power. Power is picked up from copper conductor bars by spring-mounted brass rollers traveling below a modified wood-slot conveyor and is fed through the breaker switches. Two common female plugs (like the one on a household electric iron) are

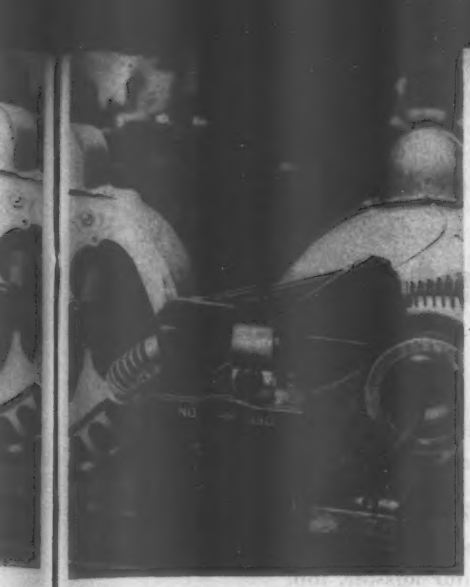
7 PLASTIC TAPE MAKES LABELING EASY

The toolroom attendant saves himself a lot of time in labeling by using plastic tape stuck to the front of the drawer. Here he's just about finished with the job of converting hundreds of bins and drawers to the new easy-to-read labels.

Tape consists of a layer of transparent plastic over a blue adhesive-coated layer. Tape is pressed into place, and then, as the attendant writes on it, he forces the plastic against the blue layer. Blue lettering then becomes visible — just like your child's magic slate. Tape comes in rolls (visible just above attendant's hand).

8 MOTOR TURNTABLE SPEEDS BRAZING

Motor magnets are brazed on this motor-driven turntable. A gear motor, mounted under the table, turns the vertical shaft. As the motor magnet is turned at one revolution a second, it's heated evenly by the torch until temperature is right for a good braze. Jack & Heintz has been using this method of brazing for about a year. The setup has paid for itself in improved quality of the brazes. Formerly the braze was made by moving the torch around the piece. With this method it was difficult to heat surfaces evenly. The resulting brazes were not of uniform quality.



CONVEYOR LINE

fitted together with copper prongs soldered into the receiving holes. Connected to one plug are two short conductor wires with rubber-covered cable clips to attach to the binding posts inside the motor. The plug-clip extension is removed as the motor comes to the end of the line and is attached to another motor at the head of the line. Everything is permanently attached to the conveyor.

6 WOOD REPLACES METAL IN FIXTURES

The four girls at the right are inserting wire coils in tachometer stators held in simple wooden fixtures which cost $3.30. In metal, they'd cost $45. The fixtures hold the stator bodies securely for the operation. They are light weight, smooth, easy to handle. It took only an hour to build each one.

Stators move from the rear forward on the right side of the table. They are checked for polarity by the girl in the left foreground. She inserts the stator in a shop-made wooden box containing a 29-cent war-surplus compass. This establishes polarity as a 6-volt current is fed through the stator leads. Stators are moved to the rear, where coils are stitched in place. Again, wooden fixtures are used.

9 WASHING MACHINE OILS FELTS

Motor-lubricating felt wicks need just so much oil. And no more. Getting the right amount of oil was a tough job when felts were oiled by hand. Now, a drum of oil (at left) is fitted with an air-operated syphon. Air comes from the plant distribution line. About five pounds of pressure will force oil into the reservoir drum (center). A pump moves the oil to the washing machine. Felts are loaded into the machine by hand and oil pumped in. As the machine spins—for 17 seconds—a pump forces excess oil back to the reservoir drum. The machine leaves just the right amount of oil in felts.

10 MIRROR CHECKS FURNACE LOAD

Heat-treating furnaces, 20 feet long, are loaded and unloaded by the same operator. The mirror lets him work both ends of the furnace safely. It's mounted at the discharge end of the woven-wire conveyor. Castings for motors are loaded onto the conveyor belt at one end. When the operator can see castings in the mirror he knows the belt's full. Without the mirror, the operator often went to the discharge end before the belt was full, wasting a lot of time. Mirrors are used on other furnaces throughout the plant, resulting in big increases in efficiency.

Once-a-Year Shutdown for Major Electrical Maintenance

The electrical men at General Aniline's Grasselli Works thought they needed a shutdown on an annual basis to get caught up. Such a shutdown would let them do their work cheaper, faster, and safer. They sold management the idea.

You don't have to be in the chemical processing industry to use this plan. Everybody has the problem of getting maintenance done with minimum interruption to production. Grasselli's annual shutdown may be your answer, too.

By CARMEN PROZILLO • Electrical Engineer, General Aniline Works, Grasselli, N. J.

LABOR DAY IS NO HOLIDAY for the electrical section of this plant's Construction and Repair Department. It's a full work day.

In 1934, the electrical section found it necessary to request management to have a complete shutdown of all operations on Labor Day—so that all important electrical equipment (distribution systems, transformer stations, powerhouse) could be properly maintained or inspected.

This request was made of management because, as in most chemical plants, production is scheduled for 24 hours a day, 7 days a week. This prevented the electrical section from checking some of the most important parts of the electrical network. The planned shutdown of the entire plant for electrical purposes met with the approval of management. Since that time, a very carefully planned annual Labor Day preventive maintenance work schedule has been put into effect.

With all production departments of the plant aware of this shutdown, production scheduling can be made far in advance so that cost of the interruption can be kept to a minimum.

Uninterrupted electrical service is most important in a chemical plant. In addition to production time lost, products in manufacture oftentimes must be scrapped—"a batch down the sewer."

Although it is planned to do everything possible to prevent shutdowns, it goes without saying that occasionally some electrical fault or equipment failure will cause an emergency shutdown.

With plant expansion progressing every year, the Labor Day shutdown soon developed into a minimum 2-day shutdown. In 1951, it was necessary to request a 3-day shutdown because numerous tie-ins for new installations and future expansions had to be made.

All new tie-ins and cutovers are now done, if possible, on the Labor Day week end so that unnecessary interruptions of power— and production —can be prevented.

The electrical men aren't the only ones who work during the shutdown. The other maintenance sections—valve and instrument shop, masons, lead burners, carpenters, etc.—have their maintenance to do then, too.

Planning the shutdown

The shutdown work is divided into three parts:

1. Annual routine maintenance. Cleaning, checking, and/or testing of electrical equipment is done to eliminate possibility of faults as much as possible.

2. Major maintenance projects. Repairing, replacing, or dismantling of electrical equipment is done as previously scheduled for the shutdown. Notes are made throughout the year for any particular "sore spots," thereby alloting a place in the schedule to permit full investigation of them.

3. New installations. This includes expansion, changes, and improvements.

The plan or schedule for each Labor Day shutdown is started a year in advance. Work is already being planned for next year. While working on the routine maintenance schedule through the year, occasionally you'll find faulty materials or equipment which is not included in the work schedule and, therefore, spare parts or materials are not obtainable or available.

To illustrate this point: During the 1950 shutdown, a cracked insulator of a special design was found on a 2300-volt circuit breaker enclosure. The feeder mounted from the insulator was one phase

of a transformer primary which furnished power to three production buildings.

Since an insulator of this type could not be obtained immediately, temporary repairs with insulating varnishes and varnished cambric tape were made. A new insulator was installed this year during the shutdown. Other temporary installations, similar to this one, were also repaired and put back into good operating condition.

What would have happened if this cracked insulator was not found? Possibly nothing — if no further insulator damage occurred. On the other hand, the insulator could have cracked completely, causing the 2300 volts to flash over to ground — thereby causing damage to the electrical equipment and production losses of an unestimated amount.

The production losses in this one particular instance could have been greater than the total wages spent for the electrical maintenance force during the 3-day shutdown.

All work to be done during the shutdown is carefully made out on work sheets. A month before the shutdown, each electrical foreman is given a detailed assignment for which he and his men are responsible. Each electrician gets instruction as to his particular work two weeks in advance of the shutdown.

The necessary wiring diagrams, instruction books, material, and tools, as required by the job, are gone over carefully. The absence of proper tools usually adds many man-hours to the job, so special tools are checked and procured for all the hard-to-get-at jobs.

What was done this year

The accomplishments in the 3-day shutdown this year are as follows:

First Day—The powerhouse electrical system was completely overhauled, including:

Cleaning the main switchboard.

Checking and testing all circuit breakers.

Checking all overload relays.

Cleaning all fuses.

Cleaning and inspecting generators and exciters.

Cleaning all control and transfer switches on main powerhouse boards.

Checking all high-voltage fuses and links.

Relocating 300-amp. oil-fuse cutouts to salt water pump station feeder.

Installing new feeder to lighting panel for No. 3 boiler.

Installing new 300-kva. transformer station.

Installing a new secondary air circuit breaker on 200-kva. transformer.

Replacing three cables with damaged insulation on one of the 220-volt distribution feeders.

Second Day—Transformer stations were completely gone over, including:

Checking and cleaning all bus bars, insulators, connectors, circuit breakers, transformer bushings.

Checking and cleaning power panels in various buildings.

Installing new power panels and switches.

Third Day—All necessary cutovers were made, including:

Installing new circuit breakers and feeders.

Rearranging lighting feeders to redistribute the load.

Installing four new power panels in the plant.

What was learned in the shutdown

One of the big discoveries this year was the saving in time by using pressure connectors on our large power feeders. On 500-MCM and 100-MCM cables, hydraulic tool-type pressure connectors were used. During the week end, more than 44 man-hours were saved on installations. The smooth surface of the connector permitted faster taping of the connection, since there were no protruding nuts or bolts to be covered. These connectors permitted the use of smaller junction boxes.

All main circuit breakers for the power distribution system were found to be in good operating condition. Some of the overload relays needed only minor adjustment. The powerhouse main distribution panel board and bus-bar network needed the usual man-hours for cleaning up dust, dirt, fly-ash, and corrosion of connections which accumulates during the year. Although nothing of a serious nature was found on the main powerhouse switch board and the associated power network, the same routine will be repeated next year.

When completely overhauling and checking the voltage regulator, the potential transformers were found to be slightly undersized. This problem is now in the hands of the voltage regulator manufacturer, and, when we get satisfactory requirement data, we shall order the correct units and plan for their installation next year.

Some of the weatherproof cable supports on our outside transformer station are showing wear which requires no immediate attention. However, plans are being made for next Labor Day by purchasing materials now for a complete support replacement.

With a future powerhouse expansion plan in mind, undersized bus-bar feeders and current transformers were found which will require revamping next year. *More on next page*

By testing and operating the handles of the high voltage main distribution circuit breakers, ground shunts to the handles were found to be slightly worn. New ones must be installed. Finding these grounding shunts worn has shown that a semi-annual check must be made in the future.

In general, equipment was found to be in about the same condition as last year. There is always that percentage of equipment which can be considered either good or fair. Once the equipment is considered fair, careful consideration is given to whether it is best economically to continue with maintenance and repair or to completely renew the installation.

Do people like the plan?

The electrical section is in favor of working during the shutdown because:

1. It gives the electrician a chance to do the job right. Breakdowns or power failures usually require immediate restoration of power, thereby causing the electrician to work under a tension which sometimes causes inferior work.

2. A lot of jobs that ordinarily would have to be "sweated out" next to a "hot feeder" can now be done with perfect safety during the shutdown. During the shutdown, the electrician is fully aware that the usual precautions required on "hot-feeders" need not be applied and, therefore, depending upon the scope of the work, considerable man-hours can be saved.

3. Although this shutdown labor requires missing a week end or holiday, it is a great relief and satisfaction to know that the main power distribution network from the powerhouse to each transformer station and building has been checked and is now in sound operating condition.

Management also likes the plan because an effort is made to have as few shutdowns as possible. They are usually reflected in production costs. Although the electrical section cannot show the direct relation between planned maintenance and the elimination of breakdowns, management has been satisfied to continue the Labor Day maintenance schedule on the existing basis.

Over the years, this annual maintenance inspection routine has brought many probable sources of troubles to light. They would probably have caused a power failure if proper attention had not been given to correct the condition.

To illustrate, a few examples emphasize the annual maintenance schedule's importance:

1. The main distribution circuit breakers are seldom opened because power is needed 24-hours-a-day. And in a chemical plant, the atmospheric conditions are such that corrosion of metal parts exists, thereby causing the operating mechanisms to operate sluggishly during either closing, latching, or tripping if proper precautions aren't taken.

2. The voltage regulator, the heart of the generating and distribution system, is completely overhauled—with contacts, pilots, and pivot bearings replaced annually. The replacement regulator parts are a must, since our records show that each year practically the same amount of wear and required adjustments are necessary. Although the regulator operation is checked each week, the complete overhaul is done annually.

3. All directional-overcurrent and time-delay relays on the main distribution system are checked to operate within their required tolerances. Sluggish operation of these units are common due to the accumulation of dust and dirt.

4. All pole lines, either for power or guying, and lightning arrestors will always be subject to deterioration or corrosion in a chemical atmosphere. The connections from the arrestors to ground have been found completely corroded.

5. Before the Labor Day shutdown, the transformer oil is tested. If the oil breakdown test shows a value of 20 kv. or less, the oil is filtered until the value of 24 kv. is exceeded. If a value of 20 kv. cannot be exceeded by filtering, the oil in the transformers is replaced during the shutdown.

6. All power distribution panels in each building are completely overhauled. All fuses and fuse clips are cleaned. If the clips show signs of loss of tension, corrosion, or "running hot" they are replaced.

After this maintenance work is completed, a figure of saving cannot be realized directly on probable prevention of faults. In other words, Labor Day preventive maintenance *vs.* saving from unknown faults is indeterminate. It's about like trying to evaluate the saving from fire prevention. You never know how big a fire you have prevented.

The electrical section is proud to have management's confidence in having a complete electrical plant shutdown so that this preventive maintenance Labor Day work schedule exists.

If there is a need for this preventive maintenance schedule in your plant, sell the idea to management. As General Aniline Work's management saw fit to continue this routine scheduled work, so will yours.

Cash in your Scrap!

Electric motors **that are "beyond repair" make a good source of salable scrap.**

YOU'LL GET BETTER SUB-STATION SERVICE FROM . . .

Five-Step Battery Maintenance

BY S. K. LESSEY • Manager, Service Division
Electric Storage Battery Company, Philadelphia

WHEN YOU NEED CURRENT from storage batteries, chances are that you *really* need it. There are exceptions, but storage batteries usually provide power for just a few critical—even emergency—uses. So failures are costly.

The way to avoid these failures is with a good program of battery maintenance. Such a maintenance program should include at least these five key points:

1 CHARGING VOLTAGE • A typical 60-cell installation in floating service should receive a charge of 129 volts, or 2.15 volts per cell. Continuous operation at other voltages shortens life.

Because the correct floating voltage may not be held at all times, raise it to 2.33 volts per cell (140 volts for a 60-cell unit) once each month for 8 to 24 hours.

2 CELL VOLTAGE • Accurate cell voltages are most easily obtained with an open-scale voltmeter. Record the readings of individual cells once a month.

Watch for active gassing shortly after the monthly equalizing charge (2.33 volts per cell) is started. Absence of gassing then is a danger sign.

Be sure to check your voltmeter at least twice a year.

3 WATER LEVEL • The electrolyte level should be maintained between the marks on the jar. You usually add water only three or four times a year to sealed cells in floating service.

Particularly if cells tend to approach the danger level at refill time, check the amount of water added to each cell. An abnormal loss of water usually indicates overcharging.

4 SPECIFIC GRAVITY • If you check *and record* individual cell voltages—to the hundredth of a volt—once a month, you need check specific gravity only three or four times a year. If you don't make the voltage check, be sure to record specific gravity on a monthly basis. Look for irregularities by comparing with previous readings.

Don't take hydrometer readings (of specific gravity) within 24 hours after you add water to cells. It takes the water that long to mix with the electrolyte.

If you keep batteries between 65F and 90F, you don't have to correct for temperature. Outside of that range, your specific gravity will be wrong unless you make the following correction: For each 3 degrees by which the electrolyte temperature is above 77F, add 1 point to the reading. For each 3 degrees below 77F, subtract 1 point from the reading.

5 COVERS AND CONNECTIONS • Bolt connectors should be checked for tightness once a year. Covers should be cleaned on a routine schedule; local conditions will determine the frequency.

Atmospheric condensation or electrolyte may cause cell covers to become damp over a period of time. In this case, the covers should be wiped with a cloth moistened with ammonia solution to neutralize the accumulated acid. If cell covers are dry, you need only wipe off dust and dirt with a dry cloth.

For either wet or dry cleaning, be sure to keep vent plugs tight in place.

What's Indirect Labor Worth?

HERE ARE SOME ANSWERS to this perennially tough question. They come from 11 different areas of the country.

You can use this summary as a checkchart to see how your own pay scales for selected indirect jobs stack up.

The wage figures in the chart on the right are important to plant operating executives for two reasons:

1. The figures cover all manufacturing industry in each area surveyed. They reflect the influence of high- and low-paying plants, both large and small. When you compare your own average rates with these figures, you can be sure your comparisons are on a sound base.

2. The figures are the forerunners of even more information, coming next year. The U. S. Department of Labor's Bureau of Labor Statistics made the 11 surveys reported here this year. Results were so useful that BLS will cover more territory in the future. The only possible hitch: necessary funds have to be approved.

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If you're unionized, your union will almost certainly get BLS survey reports when they come out. That means they'll have "cross-industry" information never before available on large-scale basis. The least you can do is have the same information. It will be tough if you don't.

These Occupational Wage Surveys (official name) are easy to get. Write your nearest BLS Regional Office and ask to be put on the mailing list for announcements of future surveys.

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Surveys were not all made at the same time. Date of each survey is shown under the city name.

	MALE JOBS, EXCEPT WHERE OTHERWISE SHOWN
Maintenance and Power Plant Jobs	Carpenters, maintenance
	Electricians, maintenance
	Engineers, stationary
	Firemen, stationary boiler
	Helpers, maintenance trades
	Machinists, maintenance
	Maintenance men, general utility
	Mechanics, automotive (maintenance)
	Mechanics, maintenance
	Millwrights
	Painters, maintenance
	Pipe fitters, maintenance
	Sheetmetal workers, maintenance
	Oilers
Custodial, Warehousing, and Shipping Jobs	Guards
	Janitors, porters, and cleaners
	Janitors, porters, and cleaners (female)
	Order fillers
	Packers
	Shipping clerks
	Receiving clerks
	Shipping and receiving clerks
	Stock handlers and truckers, hand
	Truck drivers, light (under 1½ tons)
	Truck drivers, medium (1½ to 4 tons)
	Truck drivers, heavy (over 4 tons, trailer type)
	Truckers, power, fork lift
	Truckers, power, other than fork lift
	Watchmen
	FEMALE JOBS, EXCEPT WHERE OTHERWISE SHOWN
Office and Technical Jobs	Comptometer operators
	File clerk, Class A
	File clerk, Class B
	Office girls
	Secretaries
	Stenographers, general
	Stenographers, technical
	Typist, Class A
	Typist, Class B
	Draftsman (male)
	Junior draftsman (male)
	Nurse (registered)
	Duplicating machine operator
	Key-punch operator
	Tracers
	General clerk

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AVERAGE STRAIGHT-TIME HOURLY EARNINGS										
$1.54	$1.71	$1.61	$1.72	$1.85	$1.81	$2.00	$1.54	$1.79	$2.05	$2.08
1.81	1.78	1.77	1.82	1.94	1.76	2.02	1.62	1.99	2.00	2.08
1.47	1.66	1.81	1.86	2.04	1.75	1.85	1.70	2.03	2.00	2.02
1.24	1.43	1.51	1.44	1.55	1.45	1.64	1.49	1.58	1.70	1.81
	1.45	1.40	1.47	1.52	1.26	1.50	1.34	1.41	1.67	1.73
1.70	1.88	1.75	1.84	1.97	1.65	1.98	1.66	1.93	1.95	1.99
1.39	1.47	1.47	1.53	1.66	1.46	1.83	1.60	1.80	1.99	1.95
1.48	1.56	1.64	1.72	1.84	1.79	1.90	1.60	1.82	1.93	2.04
1.59	1.68	1.70	1.82	1.87	1.66	2.02	1.60	1.85	1.87	1.97
1.97	1.67	1.73	1.75	1.91	1.85	1.97		1.83	2.01	
1.65	1.71	1.63	1.66	1.81	1.86	1.89	1.50	1.76	2.04	2.08
1.84	1.77	1.67	1.77	1.89		2.02		1.86	1.96	2.05
1.91	1.76	1.63	1.83	1.95		2.04	1.74	1.82	2.00	2.06
1.11		1.37	1.44	1.53		1.56		1.44	1.69	1.58
$1.48	$1.44	$1.27	$1.47	$1.41	$1.47	$1.63	$1.33	$1.38	$1.61	$1.57
1.06	1.20	1.18	1.23	1.24	1.03	1.35	1.13	1.20	1.38	1.46
.86	.94	1.04	1.17	1.19	.84	1.25	.89	1.11	1.11	1.33
1.23	1.22	1.33	1.43	1.37	1.25	1.57	1.30	1.31	1.60	1.58
1.15	1.23	1.26	1.32	1.35	1.05	1.56	1.33	1.27	1.44	1.54
1.43	1.24	1.30	1.47	1.58	1.43	1.61	1.38	1.38	1.67	
1.40	1.38	1.22	1.38	1.45	1.57	1.66	1.29	1.37	1.60	
1.23	1.44	1.38	1.56	1.52	1.34	1.60	1.24	1.37	1.75	1.70
1.06	1.18	1.30	1.34	1.40	1.12	1.48	1.23	1.41	1.55	1.56
1.28	1.41	1.90	1.25	1.61	1.02	1.59	1.26	2.15		1.80
.98	1.43	1.57	1.46	1.98	1.09	1.48	1.34	1.80	1.73	2.00
1.15	1.53	1.68	1.53	1.90	1.18	1.59		1.81	1.87	1.94
1.17	1.52	1.57	1.50	1.52	1.32	1.62	1.20	1.63	1.64	1.64
1.44	1.52	1.41	1.47	1.55		1.62	1.34	1.54	1.75	1.61
.92	1.11	1.22	1.16	1.21	1.06	1.44	1.10	1.21	1.42	1.44
AVERAGE STRAIGHT-TIME WEEKLY EARNINGS										
$49.50	$48.00	$42.00	$45.50	$53.00	$49.00	$55.50	$45.00	$49.00	$51.50	$53.00
42.50	46.00	47.50	50.50	48.50	40.50	51.00	39.50	48.50	45.00	51.00
39.00	36.00	39.00	41.00	41.50	38.00	44.00	39.00	37.00	44.50	49.50
36.00	32.00	36.00	37.50	40.00	33.50	46.00	33.00	34.50	37.50	46.00
56.50	59.00	56.00	60.00	62.50	57.50	64.50	55.50	63.50	62.50	68.50
49.50	48.00	45.50	51.50	52.50	52.50	57.50	46.00	47.00	52.50	58.00
47.00	48.50	49.50	54.00	57.00	53.00		44.50	57.00	61.00	60.50
49.50	45.00	45.50	47.50	51.00	42.50	57.00	43.00	51.00	47.50	54.00
40.00	39.50	40.00	44.00	45.50	42.00	44.50	40.50	42.00	44.00	48.00
71.00	76.50	76.50	83.50	78.00	72.00	81.00	68.50	80.00	77.50	79.50
39.50	52.00	55.00	61.00	58.50	50.50	65.50	67.50	53.50	68.50	58.50
53.00	60.00	58.00	61.00	62.00	60.50	67.50	57.50	63.00	58.50	63.00
36.00	40.50	41.50	41.00	44.00	39.50	51.00	40.00	42.50	45.50	51.00
44.00	48.00	42.50	45.50	50.50	55.00	52.00	46.00	47.00	53.50	53.50
	49.00	44.00		52.00			57.00	45.00		
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	Helpers, maintenance trades
	Machinists, maintenance
	Maintenance men, general utility
	Mechanics, automotive (maintenance)
	Mechanics, maintenance
	Millwrights
	Painters, maintenance
	Pipe fitters, maintenance
	Sheetmetal workers, maintenance
	Oilers
Custodial, Warehousing, and Shipping Jobs	**Guards**
	Janitors, porters, and cleaners
	Janitors, porters, and cleaners (female)
	Order fillers
	Packers
	Shipping clerks
	Receiving clerks
	Shipping and receiving clerks
	Stock handlers and truckers, hand
	Truck drivers, light (under 1½ tons)
	Truck drivers, medium (1½ to 4 tons)
	Truck drivers, heavy (over 4 tons, trailer type)
	Truckers, power, fork lift
	Truckers, power, other than fork lift
	Watchmen
	FEMALE JOBS, EXCEPT WHERE OTHERWISE SHOWN
Office and Technical Jobs	Comptometer operators
	File clerk, Class A
	File clerk, Class B
	Office girls
	Secretaries
	Stenographers, general
	Stenographers, technical
	Typist, Class A
	Typist, Class B
	Draftsman (male)
	Junior draftsman (male)
	Nurse (registered)
	Duplicating machine operator
	Key-punch operator
	Tracers
	General clerk

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1.24	1.43	1.51	1.44	1.55	1.45	1.64	1.49	1.58	1.70	1.81
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1.70	1.88	1.75	1.84	1.97	1.65	1.98	1.66	1.93	1.95	1.99
1.39	1.47	1.47	1.53	1.66	1.46	1.83	1.60	1.80	1.99	1.95
1.48	1.56	1.64	1.72	1.84	1.79	1.90	1.60	1.82	1.93	2.04
1.59	1.68	1.70	1.82	1.87	1.66	2.02	1.60	1.85	1.87	1.97
1.97	1.67	1.73	1.75	1.91	1.85	1.97		1.83	2.01	
1.65	1.71	1.63	1.66	1.81	1.86	1.89	1.50	1.76	2.04	2.08
1.84	1.77	1.67	1.77	1.89		2.02		1.86	1.96	2.05
1.91	1.76	1.63	1.83	1.95		2.04	1.74	1.82	2.00	2.06
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1.43	1.24	1.30	1.47	1.58	1.43	1.61	1.38	1.38	1.67	
1.40	1.38	1.22	1.38	1.45	1.57	1.66	1.29	1.37	1.60	
1.23	1.44	1.38	1.56	1.52	1.34	1.60	1.24	1.37	1.75	1.70
1.06	1.18	1.30	1.34	1.40	1.12	1.48	1.23	1.41	1.55	1.56
1.28	1.41	1.90	1.25	1.61	1.02	1.59	1.26	2.15		1.80
.98	1.43	1.57	1.46	1.98	1.09	1.48	1.34	1.80	1.73	2.00
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39.00	36.00	39.00	41.00	41.50	38.00	44.00	39.00	37.00	44.50	49.50
36.00	32.00	36.00	37.50	40.00	33.50	46.00	33.00	34.50	37.50	46.00
56.50	59.00	56.00	60.00	62.50	57.50	64.50	55.50	63.50	62.50	68.50
49.50	48.00	45.50	51.50	52.50	52.50	57.50	46.00	47.00	52.50	58.00
47.00	48.50	49.50	54.00	57.00	53.00		44.50	57.00	61.00	60.50
49.50	45.00	45.50	47.50	51.00	42.50	57.00	43.00	51.00	47.50	54.00
40.00	39.50	40.00	44.00	45.50	42.00	44.50	40.50	42.00	44.00	48.00
71.00	76.50	76.50	83.50	78.00	72.00	81.00	68.50	80.00	77.50	79.50
39.50	52.00	55.00	61.00	58.50	50.50	65.50	67.50	53.50	68.50	58.50
53.00	60.00	58.00	61.00	62.00	60.50	67.50	57.50	63.00	58.50	63.00
36.00	40.50	41.50	41.00	44.00	39.50	51.00	40.00	42.50	45.50	51.00
44.00	48.00	42.50	45.50	50.50	55.00	52.00	46.00	47.00	53.50	53.50
	49.00	44.00		52.00			57.00	45.00		
48.00	47.00	52.50	48.00	54.00	47.50	54.50	48.00	50.50	48.50	

INDICATOR BOARDS list all tools and parts in stock under descriptive names. Tab gives item number and bin location. Cross reference manual makes it easy to check against blueprint or customer's number.

BINS ARE ARRANGED to permit systematic grouping of common items. Sequential numbering of bins

YOU CAN SAVE SPACE, CUT PRODUCTION DELAYS WITH A

Scientific Stockroom Setup

Systematic layout and systematic records speed delivery of production tools. Many errors have been eliminated. Inventory has been reduced. And it's all done in 20% less space.

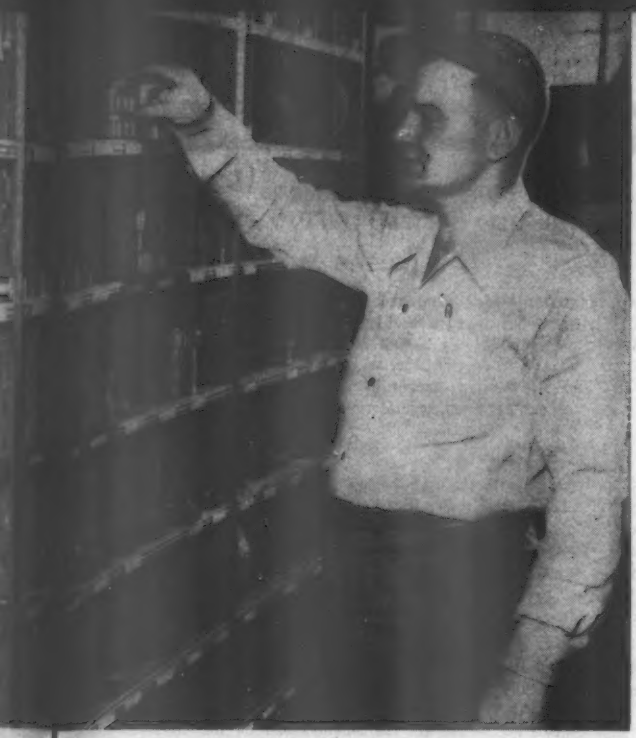
By J. D. LEIGHTON • Vice President
Pressed Metals of America, Inc., Marysville, Mich.

IT TOOK US TOO LONG to find production tools in our stockroom. Sometimes after an extensive search—and with a man and machine waiting idle—we found we didn't have the item on hand at all.

We had known about this condition for a long time. A careful look showed that the basic faults in our operation were:

1. No stock record or bin locator system existed.
2. There was no standard nomenclature or description information on our tools or repair parts.
3. There was no information regarding interchangeability of items.
4. Identical items were in several different bins, and frequently several different items were together in a single bin.
5. An acceptable inventory was impossible.
6. Stockroom attendants, through no fault of their own, sometimes issued wrong items. Since we had as many as nine different form tools with the same customer's number, it was no trick at all to issue the wrong tool. When that happened, all of the end products made with this incorrect form tool ended up as scrap.
7. We were heavily overstocked on many items. Sometimes an item would be re-ordered because the stock had diminished in one bin, while a more than sufficient quantity was stored in one or more different bins.

HOW WE TACKLED THE PROBLEM • We reasoned that specialized assistance was needed to solve our problem. Consequently, we engaged the services of a commodity classification specialist. We assigned to him six men who had never worked in the stockroom before, but who were familiar with the tools and parts they themselves had actually used on machines in the plant.



makes them easy to find, cuts possibility of items getting "lost" in inventory. Some bins are purposely empty to provide for later expansion.

We specified that the program could not interfere with normal production. Disbursements and receipts of parts and tools had to be handled continuously while changes were being made.

These are the steps we took to complete the reorganization of our stockroom:

1. **Obvious errors in binning were corrected.**
2. **Location numbers were assigned to all bins.**
3. **A simple work card was developed.** A separate card was made up for each different item.
4. **Standard nomenclature was used** to describe each item.
5. **Descriptions were written for each item** in accordance with patterns prepared by the classification specialist.
6. **Work cards on which descriptions were written were filed by item name**—and within each item name, by descriptive characteristics.
7. **A stock numbering system was developed.** A stock number was assigned to each item. We provided for future expansion by leaving gaps of numbers at selected intervals.
8. **A bin locator system was developed.** The stock was re-binned in a logical arrangement.
9. **A bin locator index was set up** at each of the two issue windows in the stockroom. In addition we set up cross-reference lists relating manufacturers' numbers, our own blueprint numbers, and customer numbers to our new stock numbers.
10. **Bin tags were prepared for each location.**
11. **An accurate inventory was taken.**

HOW THE NEW SYSTEM PAID OFF · The investment in the stockroom reorganization program began to pay dividends immediately:

The number of machines waiting for tools has dropped to a negligible figure, with a corresponding increase in production.

In the stockroom itself, space-saving amounted to about 20% over all, despite the fact that parts and tools were moved in from another crib.

About 25% of our total binning space is now available for future expansion, and approximately 7% of our bin sections are completely empty.

A large quantity of obsolete items has been removed from inventory. Considerable revenue should be realized from their sale.

In the long run, the biggest saving will come from positive inventory control. This includes not only assurance that out-of-stocks and overstocks can be eliminated, but also the means to establish an accurate rate-of-usage on all items.

Paperwork in our stockroom has been reduced to the extent that the attendants are required only to record the stock number and quantity, and check the disposition on a requisition for each issue. Requisitions are posted daily to our inventory record and new balances are extended by a clerk in the office. This clerk originates orders for material to be purchased.

There is a great value in the knowledge of the interchangeability of parts. Having established interchangeability of parts, we are able to reduce our over-all inventory investment. Also, in a tightening market, we now have a choice of vendors in case lead time for delivery runs high.

This has reduced the number of end products that hit the scrap pile. We have eliminated the costly errors in issuing tools by the assignment of blueprint numbers to all tools we manufacture for our own use. The numbering system has also increased the speed of filling requisitions.

Our whole purchasing procedure has been simplified now that we know exactly how our inventory stands. With an accurate estimate of probable usage of tools and parts, we can set up adequate lead time for replenishing stock.

One of the best things in the whole streamlining operation has been employee acceptance. Our men are paid on a piecework basis, according to how much they produce.

We negotiated equitable rates to be paid the six men who assisted the classification specialists. These men have now been retained in the stockroom, two men on each shift. So in addition to all the other savings, we now require only six men, instead of nine, to handle tool and part issuing.

Cash in your Scrap!

You help **the defense effort and your profit statement when you scrap and sell your broken tools.**

THE 10 BIG FAULTS POST CEREALS FOUND IN ITS MAINTENANCE SYSTEM

	HERE'S HOW IT WAS UNDER THE OLD SYSTEM	HERE'S HOW IT IS UNDER THE NEW SYSTEM
1 SUPERVISION	**POOR** • Impossible to maintain direct and close supervision over craftsmen because each foreman was responsible for maintaining equipment and installing new projects over the entire plant	**GOOD** • Area maintenance foreman in each of several small areas has time to see every craftsman and to inspect all parts of the area several times a day. Construction foremen work only on construction jobs in specific locations. They have a limited number of jobs at one time, so they can inspect each job several times daily.
2 JOB COORDINATION	**POOR** • Inadequate coordination on construction or maintenance jobs at the job site. Impossible for the master mechanic or his assistant to coordinate jobs because of physical setup and lack of formal planning. Since there was no one man in charge of a multi-craft job, no one foreman could coordinate the various crafts.	**GOOD** • In the maintenance areas the supervisor has men of all crafts under his control. He can coordinate the work of any of the crafts at the job site. In construction projects the central planner coordinates the crafts for the construction superintendent.
3 COST CONTROL	**POOR** • Unsatisfactory control of job costs, because each craft was concerned with only its own part of the estimated cost of the project	**GOOD** • Maintenance supervisor is held for any over-run in maintenance costs of jobs for which he has responsibility. Although the central crews have no one-line supervisor immediately in charge, the smaller load on the construction superintendent makes it possible to place on him the over-all responsibility for construction costs.
4 TRAVELING TIME	**EXCESSIVE** • Supervisors and craftsmen lost much time traveling to and from various working places, the maintenance building, and storeroom	**MINIMUM** • Area craftsman sticks to his area. Each area has a stock of storeroom supplies. Travel to the maintenance building is minimized. Material for construction crews is readied in the accumulation center before starting the job. Fewer jobs are held up because materials are not available.
5 MAINTENANCE SERVICE	**SLOW** • Service was slow because of the distance between the maintenance building and an operating department. Without preventive maintenance the burden of discovering trouble was on production operators and supervisors.	**FAST** • Preventive maintenance anticipates breakdowns. If one does occur, area craftsmen are soon on the spot to fix it. The central planner can plan ahead and concentrate on any job. Thus management can decide which jobs it wants worked on. This, in turn, improves service.

10 Key Steps You Can Take

By JAMES STONE • Maintenance and Construction Superintendent
Post Cereals Division, General Foods Corp., Battle Creek, Mich.

If you're a maintenance man — you've already heard the time-honored complaint that "maintenance isn't delivering the service we need." This article will help you make that remark obsolete in your plant.

If you're *not* a maintenance man — reading this article will give you a better understanding of why you're not getting all the service you might like, and how *you* can help improve it. And maybe you'll want to send this article along to your top maintenance man — just as a reminder.

– AND HOW IT ATTACKED THEM

	HERE'S HOW IT WAS UNDER THE OLD SYSTEM	HERE'S HOW IT IS UNDER THE NEW SYSTEM
6 COMPLETION DATES	**INDEFINITE** • Unable to predict completion dates of either construction or maintenance jobs, because one type of job so greatly affected another, or interfered with another.	**ACCURATE** • In the maintenance areas, work is scheduled daily. Load charts enable area maintenance foreman to tell the production department, with good accuracy, when he can complete any job. Likewise, project planning charts and load charts of work of central crews makes reasonably accurate predictions possible.
7 WORKER MORALE	**LOW** • Many craftsmen lacked pride in their work. They worked on equipment all over the plant, rarely finished a job without interruption, and worked on no single type of equipment often enough to develop special skills. No way of tracing work back to the craftsman who did it. He seldom was praised for good work, or criticized for poor work.	**HIGH** • Both the area and central crews see their jobs to completion. Every job can be traced back to the craftsman who did it. Pride in workmanship is growing. Because area craftsmen are becoming interested in operating efficiencies, they have joined in the spirit of the production department to get jobs done as fast as possible to get out production. Area craftsmen are more careful not to spoil products.
8 WORK PLANNING	**POOR** • Little advance planning of any jobs, and often incomplete engineering of jobs before starting them.	**GOOD** • All work has to be planned. This calls for more complete engineering of jobs and adherence to schedules. In one typical month, 18 out of 20 jobs were completed on-time
9 JOB SCHEDULING	**ERRATIC** • Frequent changes in job priorities by management because, without a good picture of the work load, it couldn't see what bad effects a change might have.	**UNIFORM** • Management asks for fewer changes because the maintenance department, at least a month ahead, provides a schedule of all big jobs. When management sees schedules held, it gains confidence in them and is less likely to switch priorities.
10 PRODUCTION-MAINTENANCE RELATIONS	**STRAINED** • Unsatisfactory relations between maintenance and production supervisors because of physical conditions that led to poor service and stood in way of improvement	**SMOOTH** • Production supervisors like the new setup, according to an attitude survey made by our management consultants. They feel the service is more prompt, there is less down-time for emergency repairs, follow-through of jobs to completion is much better, job clean-up is improved, and general condition of equipment is better than before.

for Better Maintenance Service

SOME OF OUR ENGINEERING DEPARTMENT PEOPLE felt keenly that the maintenance department should give better service. That was back in 1948 and 1949.

There was plenty of evidence for this belief. We made a self-analysis of our maintenance operations and returned our own indictment. You can see it in the list of 10 complaints above.

We studied these problems, and planned a program of remedies. We called in a well-known firm of management consultants to help us attack and implement the program. The major push to better maintenance took almost a full year.

Was it worth it? Just look at the 10 benefits (also tabulated above) arising from the cures we applied to the complaints. We haven't yet perfected all the techniques. But we are polishing them up and expect top efficiency in another year.

THE OLD MAINTENANCE SETUP • The Post Cereals Division plant covers about 40 acres of floor space in some 10 multi-storied buildings. It employs about 3000 people, including 250 in plant maintenance and construction.

Before 1949, maintenance operated along central craft lines. All crafts had headquarters in the maintenance building on a corner of the plant site. The

maintenance division, under an assistant plant engineer, was responsible for both maintenance and construction work within the plant.

The master mechanic and his assistant reported to this assistant plant engineer. In turn, foremen of all the crafts reported to them. Each craft operated plantwide within its jurisdictional lines. The storeroom, however, reported directly to the plant engineer.

Construction jobs were handled by all crafts, largely through oral instructions from the master mechanic and his assistant. Each multi-craft job required close coordination.

Maintenance jobs were limited almost entirely to repairing breakdowns which production foremen reported to the craft foreman having jurisdiction over the equipment involved. Each craft foreman was responsible to see that equipment all over the plant in his realm was in operating condition.

The net result was that when large construction jobs were on, normal maintenance was neglected. And if a breakdown occurred, the construction job was held up. It was difficult to coordinate the work. Craft foremen had a tough time deciding which jobs were the more important. It was a picture of many interruptions leading to plenty of uncompleted installations and make-shift repairs.

THE PROBLEMS WE FACED · We realized these procedures were costly and inefficient. The department wasn't meeting the demands on it. It wasn't serving production departments properly. Management appeared to be dissatisfied. The engineering department itself was stymied at times.

So we decided to analyze the functions of the maintenance department to see if we could propose changes to improve its efficiency. This is the bill of complaints you've already looked over.

HOW WE CAME TO THE SOLUTION · We knew changes were needed in maintenance organization, physical location, and methods if we were to operate at an acceptable standard. But we also realized these changes would have to be considered carefully and thoroughly worked out and understood prior to any action. We could not afford to give any poorer service than before during the transition.

We examined the problem from all angles, studied literature, and visited other plants to get ideas. Here are the mainstays of our proposed plan for its solution. We decided to:

1. Separate the maintenance function from construction work, as much as possible, and install a maintenance superintendent to supervise it.

2. Install a construction superintendent to head up construction work, and to supervise the central millwright, electrical, and pipe fitter crews and other central shops. Thus, maintenance and construction would work in parallel, and both superintendents would report directly to the assistant plant engineer.

3. Divide the plant into maintenance areas.

4. Staff each area with a crew of mixed crafts working under one supervisor or area foreman, reporting to a maintenance superintendent.

5. Provide shop facilities in each area needed to service that type of equipment.

6. Establish a routine of preventive maintenance inspections.

7. Make lubrication the responsibility of area crews.

HOW WE INSTALLED THE PLAN · Before introducing the new plan we explained it in complete detail to all maintenance supervisors, the labor bargaining unit, and the craftsmen in the maintenance department. We encouraged and discussed any questions from the supervisors or craftsmen in meetings spread out over two months.

Our reason: We felt that if the plan were understood we'd have less difficulty in making the changes. Also, we got assurance that the craftsmen and the bargaining unit would support the plan.

TRAINING — KEY TO SUCCESS · We set up training conferences for all supervisors involved:

The major objective was to enlist active support of supervisors in finding solutions for problems encountered in setting up the new system.

The second objective was to train the supervisors in scheduling, planning, and preventive maintenance.

These meetings were combination training meetings and conferences. Any time anyone had a question to consider, it was discussed. Conferences were held weekly during the entire time that the installation was being made. They were conducted by the author, the maintenance superintendent, the construction superintendent, and the training supervisor from the personnel department.

As a guide for training on scheduling, planning, and preventive maintenance, we used information provided by our management consultants.

Because of the major change in organization, some of the supervisors were concerned over their ability to supervise mechanics of varied crafts. Through these training conferences we were able to tell the foremen how we wanted them to supervise, which dispelled their fears of inability to supervise.

The general outline of these meetings was as follows:

1. Discussion of reasons for reorganization.
2. Discussion of new organization chart.
3. Sequence of making installation.
4. Responsibilities of area foremen.
5. Stores procedure.
6. Work-order procedures.
7. Preventive maintenance procedures.
8. Construction-job procedures.

In addition to conferences held with supervisors, we held department meetings with all craftsmen. They were particularly concerned as to whether we intended to change jurisdictional lines among

crafts. We assured them that we were bound by contract with the bargaining unit to make no changes in jurisdictional lines, and had no intention of making such changes.

The objective of these meetings was to acquaint the men with the plans for change so that their help and suggestions could be utilized. Many helpful ideas from these meetings with the craftsmen were incorporated in the new installation.

HOW WE REORGANIZED · We made the actual reorganization step by step, and area after area. Our master mechanic became the maintenance superintendent; his assistant, the construction superintendent.

Designing the detailed procedures and setting them up in the first area took about three months, or one-third of the total installation time.

We then proceeded to other areas in rapid sequence and rechecked earlier areas to make sure procedures were being followed.

For each of the areas we developed work scheduling and inspection procedures never used before in this plant. We therefore experienced some difficulty in introducing new methods of work scheduling because they required work planning of each job beforehand. This was a concept new to our men. So we had to keep selling the supervisors.

After setting up all the areas we tackled the shops and central crews. We had originally planned for various central construction crews, each made up of mixed crafts. Our consultants believed such a setup would require too much shifting of craftsmen among crews, particularly until our engineering was improved. They proposed we maintain a craft alignment in one large central crew, and provide a central planner to plan all the work of this crew. In this way, crew subdivisions would always be sized to the job.

This method requires detailed work estimates that break jobs into elements and give man-hours by craft for each element. Using these estimates the central planner then can schedule the work of all the central crafts.

Right from the start this central planning scheme was well received. Our craft supervisors liked it because it outlined in detail what their craftsmen were expected to do the next day. They no longer worried about *what* job to do—they could now concentrate on *how* best to do it.

From the data provided by the central planner and the area planning charts, we can issue several executive reports on the current work load. Also, we can exhibit the installation schedule for the maintenance department. We now submit such reports to top management periodically.

TO SUM UP · We're doing a much better job of maintenance. We are improving interdepartment relationships. We are working under much more pleasant circumstances. And last but not least, we are saving the company money.

You'll Get a Lot of Good Out of FACTORY's Regular Departments Because...

. . . **MATT MURPHY** worked with the same problems you do. He was an industrial relations director before he came to us. His *Tips to Good Human Relations* is must reading for every plant operating executive, not just the personnel man. Page 116.

. . . **CARL WYDER** gives you the benefit of his experience as plant engineer in several companies. He sorts half-a-hundred maintenance ideas to bring you half-a-dozen *Maintenance Pointers* each month. In this issue, Carl tips you off to some high spots of the Plant Maintenance Show next month—page 132.

. . . **BOB RICE** is just out of industry as a chief industrial engineer. He's keen on ideas from one kind of plant that can be applied in others. One place you see these ideas is in *Operating Shorts*. Maybe you don't handle lemons (page 98), but Bob bets the principle can be applied to sorting and warehousing in many industries.

. . . **JOE ST. ANDRE** has spent his life trouble-shooting electrical maintenance—from the shops up to the corporation level. In *Joe's Department* this month he takes you to the Carborundum Company to prove that recognition and morale are essential to a good plant electrical section. Page 122.

. . . **CARROLL BOYCE** did a stint as a consultant for NPA. He keeps in close touch with the mobilization planners. But as an engineer, he can make Washington make sense to plant men. In an insert after page 64 he tells what controls you face as you enter 1952.

. . . **LEW URQUHART** gets an in-basket full of ideas every day. Reading them's a job in itself. But picking—and boiling down—the best 20 or so for *Ideas of the Month* calls for seasoned judgment. Lew has it—almost a decade in industry, over 20 years with FACTORY. This month's *Ideas*, page 86.

. . . **PAUL KING**, whose main job is at Bigelow-Sanford Carpet Co., is an experienced labor lawyer and negotiator. He sees all important labor developments. And Paul knows which are significant because he faces your problems every day. He's our eyes and ears on *Practical Labor Relations*. Page 200.

TIPS TO GOOD HUMAN RELATIONS for factory executives

By M. J. MURPHY • Industrial Relations Editor, FACTORY

OWL CLUB CAN HELP NIGHT SHIFT

Except in big cities, night shift work poses many recreational problems for employees. There's nothing to do, not even movies open in many cases. Result: You knock yourself out trying to get workers for night shift jobs.

That's where an Owl Club may come in handy—like the one reported by Commercial Controls Corporation, Rochester, N. Y. The Owls—night shift workers only—start their social activities at about 3:30 in the morning. Gatherings are held in a local clubhouse, reserved for the occasions, and always include an early-morning "luncheon."

Plans are now under way for expanded activities, including picnics, fishing trips, hunting parties, and, of course, athletic teams.

At hours when there's normally little to do, affairs like these fill a real need. They also simplify hiring for night shift work and keeping people on the job.

HOW TO GET KEY PEOPLE TO READ MAGAZINES

How do you get your key people to read the magazines they ought to read? One way is to pay for the subscriptions, have them sent to the employee's home, where he has the leisure time to read them.

That's what Pangborn Corporation, Hagerstown, Md., is doing now. It foots the entire subscription bill for about 150 key personnel—department and division heads, engineers, designers, draftsmen, foremen, and squad leaders. Each has at least one trade paper, selected by him and for which he's eligible under the magazine's circulation standards, sent to his home. Higher ranking men are allowed more than one. Five is the top number allowed. The company subscribes to 160 different magazines.

In addition to these home subscriptions, copies of the 160 magazines are placed in an employees' library, may be borrowed for use at home or in the office.

What does it cost? Only $1000 per year. And well worth it, says Pangborn. "We feel that this type of reading is important in the furthering of the professional ability of each of our employees. . . . We want each to know that the company is interested in his professional progress. It's a wonderful morale builder."

BUILD YOUR OWN BLACKBOARDS

Ever been caught needing a blackboard in an emergency? Or with a budget that's already shot, with no room for buying blackboards for a conference room or classroom? If so, you'll be interested in a new green "blackboard paint." It's called Rite-on-Green, manufactured by Sapolin Paints, Inc., 229 E. 42nd St., New York. You can put it on easily with brush or spray gun, says the maker. And it's supposed to give you the same slate-like writing surface you get on regular slate or glass chalk-boards. Erases well, too, they say, and can be washed. Costs $2.10 a quart, in hardware and department stores.

AFTERMATH OF A STRIKE

Last April, FACTORY reported Hawaiian Pineapple Company's unusual method of communicating with employees ("Let Workers Tell Your Story for You" p. 62, April 1951). Almost as freshly printed copies went into the mail, the company's workers went on strike, and stayed out on strike for over 200 days.

Did that mean Hapco's policies, as reported by FACTORY, weren't so hot? FACTORY didn't think so, but decided to get one of McGraw-Hill's Hawaiian correspondents to keep track of what went on, and report at the end of the strike. Here's the result, right from the scene —the island of Lanai:

"Last April FACTORY inquired about the effects of the Lanai strike on employee-employer relations at Hapco. The strike ended last week, after more than 200 days—the second longest in island history.

"Surprisingly, however, the tiny island community of Lanai, where everyone works for the pineapple company or provides services for workers, came through the strike without bitterness. The company gave its employee policies a real acid test at Lanai, and figures it paid."

So, say we, strikes or not, good employee relations policies pay. And Hapco's an example.

SAFETY STARTS AT HOME

Another evidence that plants are realizing the importance of home influence on a worker's care for safety in the shop:

Thompson Products, Inc., Cleveland, announces a big essay contest for children of employees. Subject: "My Daddy Should Work Safely Because . . ." Contest rules require children to complete this statement in 250 words or less. Children must be under 15 years of age, and parents must be factory employees. Rules also say that parents may help the kids to write their essays. Makes safety a family project.

The company has printed up contest blanks, and has a fine line-up of prizes, including two bicycles, a clock radio, and two pen and pencil sets. With plenty of publicity in TP's fine magazine, *Friendly Forum*, the idea is a sure-fire arouser of family interest in keeping the breadwinner safety-conscious.

NO MORE HANGOVERS

If hangovers are a production and attendance hazard in your shop, there's a new product you ought to check—or have your nurse or doctor check. It's reported by its makers as a "blessing to all factory and office employees and to wives responsible for seeing that their 'man' gets to work on time, regardless of alcoholic imbibing the night before."

The name: Sobertabs. Cost is $1 for plastic vial of 12 tablets—enough for six binges. Made by The Amlo Company, 64 Randolph Street, Chicago 1. Said to be in drug stores now.

We can report the benefits of Sobertabs only by hearsay.

CANDY PROFITS FINANCE PARTY FOR KIDDIES

Ford Motor's Lincoln Mercury plant in Metuchen, N. J., has a simple method to help its employees' annual Christmas party for children—and to help the employees, too. In November the cafeteria starts selling Christmas candy to employees. All the profits go to the kiddies' Christmas party fund.

Employees find the plan convenient, and the prices of the candy low enough to give them a real saving. Works fine for everybody.

WHAT ABOUT THAT MONDAY BEFORE CHRISTMAS?

Lots of companies are giving employees the day off on Monday before Christmas (see survey report, page 80). If you can afford it, it's a nice thing to do. But here's a word of warning, from a young executive who's already burned up about the way his company is handling it.

"Watch your timing," he warns, "or you'll lose the good will you're trying to build." Here's his story:

"The place is full of rumors and questions about whether we're going to have Monday off. The only answer you get is, 'Looks like it, but it's not official yet.'

"What I can't understand—nor can anybody else—is why all the pussyfooting. Either we get the day off, or we don't. I suppose, it'll end up with a last-minute announcement that we can have the day off. But if everyone feels the way I do, they'll be in no mood to appreciate it."

HOW TO USE INSURANCE DIVIDENDS

Good experience with employee insurance plans often leads to dividends (refunds) at the end of the year. If you're paying the whole cost of insurance plans, you'll naturally apply the dividends to reduce the cost. But what if employees pay part? Do you still apply dividends to reduce your share of the cost? Many companies do, and have trouble explaining that they're still paying the lion's share.

One way to get around this problem is to grant a "free period" during which the employees don't have to pay any insurance premiums. That's what Armco Steel Corporation, Middletown, Ohio, is doing. This year, the paid-up premium period is two months.

Armco employees pay 40% of the cost of insurance, the company the rest. Under the free-period plan, there's no doubt in anyone's mind that Armco is giving employees full benefit of all dividends earned by policies in the company's insurance package.

INTERLOCKED ARMORED CABLES are suspended from ceiling on aluminum racks. Continuous runs from sub-station to point-of-use are no problem with this type of cable. Conduits for the old system—capacity much too small for new requirements—can be seen fastened to the ceiling.

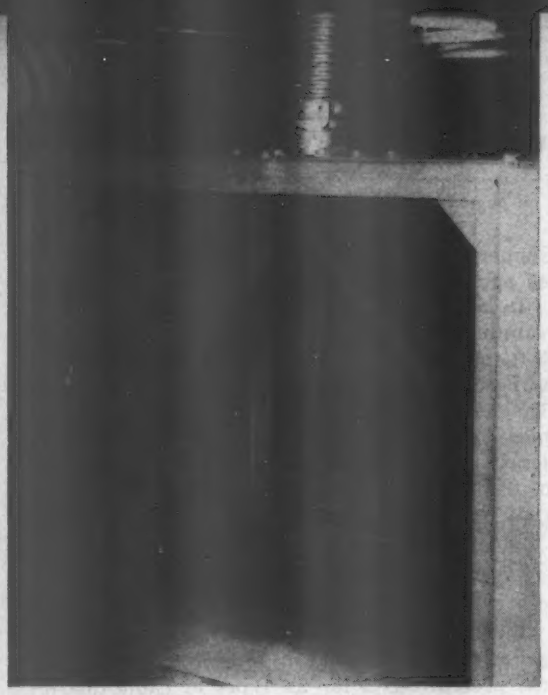
New Cable Cuts Cost of Power Distribution System

COMPARISON OF INTERLOCKED ARMORED CABLE with other carriers for distribution systems
(Rated capacity 2000 amperes at 480 volts)

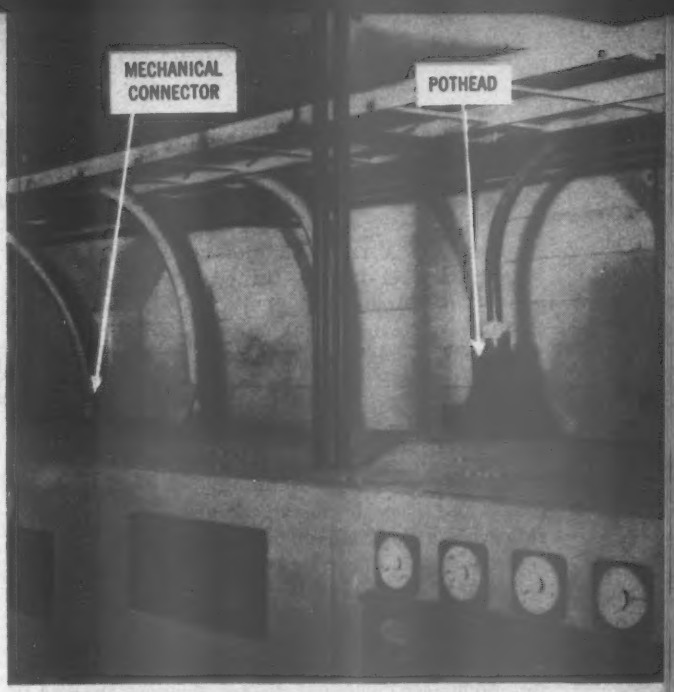
CARRIER	POUNDS OF CRITICAL MATERIAL PER 100 FEET		COST PER 100 FEET
	COPPER	STEEL	
Varnished cambric insulation in interlocked armored cable*	**2375**	**1168**	**$3000**
Type RH rubber insulation in steel conduit	3475	4910	$4660
Impregnated asbestos and varnished cambric in steel conduit	2781	4140	$3954
Varnished cambric and braid in steel conduit	2781	4140	$3966
Airated bus-way	3000	990	$4976

* Figures based on steel racks. In actual installation, Cadillac used aluminum racks because they were more readily available, thus reduced steel use still more.

DECIDING FACTOR in comparison is usually dollars. But Cadillac looked carefully at use of critical materials, too. Bus duct would have saved a little steel, but would have used more copper than the new cable—and cost two-thirds more. Interlocked armored cable was also quickest, easiest to install.



INTERNAL HOOKUP at switchgear is similar to arrangement for so-called BX cable. There are no lead-wiped joints that need expert cable splicers.



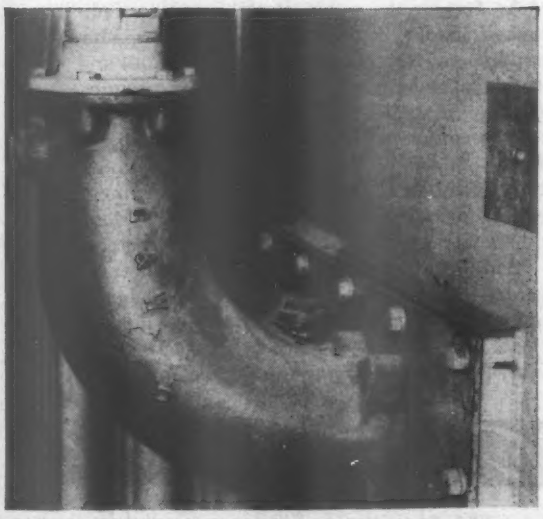
CONNECTIONS TO SWITCHGEAR are simple. Mechanical connectors take the place of the awkward potheads required with leaded cable.

Interlocked armored cable was a big money and materials saver for Cadillac's Cleveland tank plant.

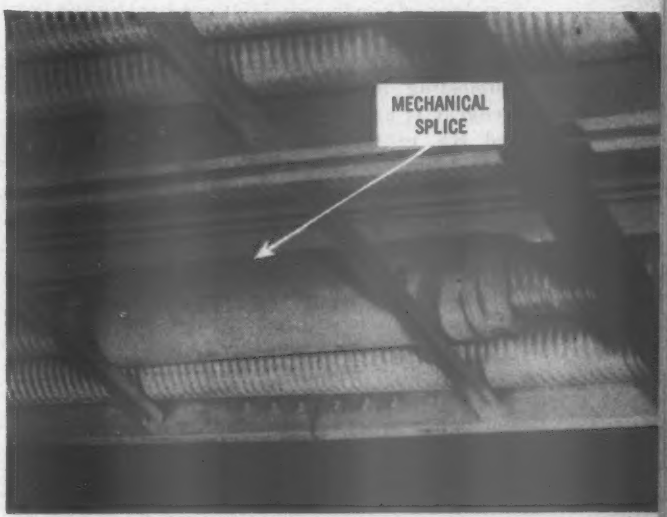
But its application isn't limited to "big jobs." If you're distributing 100 amps or more, up to 15,000 volts, it may be your dish.

We liked the looks of this relatively new cable when we saw it at Cadillac. So we checked with some of the men responsible: A. C. Cousins of the Cadillac staff; John Bos & Associates, the consulting engineers; and D. M. Daley of General Electric's Wire and Cable Department.

Turn the page to learn what we found out ▶



ONLY NEED FOR POTHEADS is outdoors or in wet locations. Even then, mechanical connectors can be used to make the job fast and relatively simple.



MECHANICAL SPLICE speeds any necessary repairs, eliminates making lead-wiped joints—a tricky, dangerous job when working on overhead lines.

Interlocked Armored Cable Cuts Cost of Power Distribution . . . *Begins on page 118*

IN LESS THAN A YEAR, Cadillac converted a World War II bomber-factory-turned-warehouse into a giant tank-production plant. The job done by Cadillar in Cleveland is a mobilization miracle.

One of the big problems was to install a whole new power distribution system—to handle the heavy power demands of an Army tank plant. So Cadillac chose interlocked armored cable, and made one of the first really big installations.

The fact that this relatively new cable is so quick and easy to install helped Cadillac reach full-scale production months ahead of schedule.

Two of the prime reasons Cadillac chose this cable are plain from just a quick glance at the table on page 118: less use of critical materials, and lower cost. (The figures are for the secondary, 480-volt system. Comparison of alternatives for the 5000-volt primary feeder system showed a big advantage for the interlocked armored cable there, too.)

Of course, initial cost isn't the only thing to consider when you're putting in a new distribution system. Will the installation be difficult? Will maintenance be a continual headache? Is the system flexible enough to permit future changes?

1 · IT'S QUICK TO INSTALL

Interlocked armored cable can be pulled in relatively long continuous runs, even with several right angle bends. This almost always means no splices between the switchgear and the connected apparatus—therefore no danger of bad splices.

Speaking of bends, you don't need to use the pull boxes required with conduit. That eliminates the danger of damaging the insulation.

Connecting interlocked armored cable at the switchgear is almost as simple as hooking up so-called BX cable. You don't need expert cable splicers to make up lead joints in potheads. You just drop down between rungs of the overhead rack into a connector.

There's one exception: You do need potheads when terminating outdoors or in wet locations. (Potheads are used primarily with leaded cable to form a hermetic seal at junctions. This prevents air from being drawn into the cable by the partial vacuum created when the lead covering fails to contract after expanding under load. The flexible jacket of the interlocked armored cable prevents this "breathing.") Even where you need potheads, fittings are available to make the connections.

Rack installation is pretty routine. The racks are made in 21-ft. lengths, with rungs on 18-in. centers. This permits the largest size cable to be bent down between rungs. When mounted with supports on 12-ft. centers, the racks will support 40 pounds per linear foot.

In pulling the cable over the racks, the convolutions of the armor tend to overcome friction. But for long pulls, you may want to do the same thing Cadillac did to avoid undue stress at bends. They fashioned rollers by inserting iron rod through pieces of conduit. The ends of the rods were fastened on top of the stringers of the rack, just ahead of the hangers. After the cable was in place, the rods were pulled out.

2 · IT'S EASY TO MAINTAIN

Putting your cable on racks means it's easy to get at for either visual inspection or repair. That's the present trend for all types of cable distribution systems. Points of failure in underground cable are just too hard to locate—and even harder to repair. Repairs on underground cables mean leaded potheads have to be disconnected (a nasty, slow job). Often new cables have to be installed.

If you do have failures with interlocked armored cable, you can make repairs quickly and right on the spot with mechanical splices.

You've already seen that interlocked armored cable is easier to pull when installing. That also protects against future failures—the strain is on the armor instead of on the insulation.

3 · IT'S SIMPLE TO CHANGE

As far as the cable itself is concerned, interlocked armor is well suited to future change or expansion. Replacing cables is simple and easy. Termination fittings are of the mechanical type (rather than lead-wiped sleeves) so that cable can be connected or disconnected with little effort. Simple mechanical splices let you connect additional lengths of cable. You can also connect interlocked armored cable to underground lead cable by using a modified form of the same connector.

Whether the installation—as distinct from the cable—is suited to changes and expansion depends on how you plan the installation. If you select racks with sufficient space to take additional loadings, new runs or changes can be made easily.

Cash in your Scrap!

DPA Administrator Fleischmann says that for the long pull, copper will be the nation's toughest material problem. Every pound of scrap will help.

Need Help With Your Problems?

IMPORTANT NEW Free CATALOGS

... they're the cream of this month's crop ... they describe latest methods and equipment.

Tell us which ones you want. Use the handy coupon at the bottom of the page.

If somebody beat you to it, there's another on page 224.

ELECTRICAL EQUIPMENT

Controllers

1 Here's a 16-page catalog of vane-type electric contact control units for use with thermometers and pressure gages. Photographs, wiring diagrams, general dimension sheets, full specifications. Also a section on potentiometers. Minneapolis-Honeywell Regulator Co.

Pressure Switches

2 If you use pressure switches, this 32-page catalog will interest you. Lists available units, diagrams for circuit detailing and an electrical rating table. Barksdale Valves.

Capacitors

3 This one tells all about fixed paper-dielectric capacitors. Complete descriptive material, how-it-works data, and application information. Prices and specification sheets. Charts of operating voltage at high temperatures. 16 pages. General Electric Co.

Pressure Connectors

4 A complete line of pressure (solderless) fittings is described in this 56-page catalog. Specification sheets and drawings, charts and index. Section for Navy-approved fittings, bus bar fittings. The Thomas & Betts Co., Inc.

Lighting Equipment

5 This 64-page catalog has 90 product illustrations, 75 cross-sectional drawings, and 59 candlepower-distribution curves. There's information on performance and applications, with full dimensional data. Also a section on the fundamentals of light control. Layout suggestions. Holophane Co., Inc.

Controls

6 There are descriptions and specifications for thermostats, humidstats, motor-operated valves, temperature regulators, control motors, and other types of controls in this 45-page catalog. Well illustrated. Full dimensions and application data are given for each control model. Many tables. Barber-Colman Co.

Diaphragms

7 Bulletin shows you diaphragms for regulators and controls. There are illustrations of each type, and a listing of construction features for the no-oil diaphragms. Vulcan Rubber Products Co.

DUPLICATE COUPON ON PAGE 224

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INSTRUMENTS 220
MATERIALS HANDLING 220
BUILDINGS 222
MISCELLANEOUS 224
PLANT ENGINEERING 226

JOE'S DEPARTMENT

FOR BETTER ELECTRICAL SERVICE

By JOE ST. ANDRE • Electrical Editor, FACTORY

• IT HELPS TO HAVE ENGINEERS TALK TO THE MECHANICS

While going through the Westinghouse Electric plant in Buffalo, I found a swell wire-drawing department.

Wire drawing calls for a great deal of automatic control. The wide range of wire sizes, spool diameters, and drawing speeds calls for control that is flexible yet extremely accurate. Control cabinets for the smallest of machines are a maze of relays, contactors, and switches.

My guide, chap by the name of Dickerson, is the electrical engineer for the department. Westinghouse regards this operation as so important that it has an electrical engineer with a master's degree to keep the equipment going.

But there is nothing long haired about Dickerson. He is the rare combination of a very high technical engineer who can go out on the floor and speak the language of the mechanics. Most of them are suspicious of engineers, but he has succeeded in gaining the confidence of the machine operators. That's a big help to Dickerson.

To be successful in shooting trouble and maintaining electrical equipment, the electrical engineer can get much help from the operators of the machines. If they will tell him the way the machine has been behaving, he can get to the trouble so much sooner.

The main controls for all the wire-drawing machines are on a balcony in the department. There is a point to bear in mind when locating controls in this way: **If control adjustments have to be made that depend on the way the machine is operating, be sure that the machine can be seen from the control platform.** Otherwise it will take two men, using telephone sets, to make the adjustment. This arrangement isn't too good, and it takes much longer than if the electrician at the control board can see the results of his adjustments.

Dickerson believes that more of the control adjustments should be placed *on the machine itself.* He disagrees with me that the ideal location for the controls cabinets would be *adjacent* to the machine. My objection to his proposal of controls on the machine is that the operator would try to make adjustments which require highly skilled electricians. There seem to be points favorable to both plans.

Ray Thompson, manager of the wire and enamel department, showed me the enameling equipment. You have seen that pretty enameled wire used in motors, coils, etc. Well, the enamel doesn't just grow on the wire. You should see the elaborate equipment that is used to maintain the proper viscosity of the enamel before it is put on the wire and baked on. All controls are on one board in the center of the room. But the solenoid valves, pumps, heaters, etc., are all over the department. Temperatures are maintained within a degree. And the way the right amount of thinner is applied is out of this world.

A simple operation is winding wire from one reel to another for shipment. You think so? Then you should see the number of motor-generator sets, controls, and control panels it takes. Dickerson says this is his hardest job to control—though it sounds simple. Give your electrical engineer a break. **Don't evaluate the job to be done by the size of the equipment that needs control.** Big troubles sometimes come in small packages.

• CARBORUNDUM'S RECIPE: RECOGNITION AND GOOD MORALE

Visited the new maintenance building of the Carborundum Company plant in Niagara Falls, N. Y., the other day. Here's a company that recognizes the value of maintenance.

Machines take a beating in this plant. The air is charged with abrasive particles. Bearings last only weeks. Other parts also get abnormal wear. So if the machines and equipment are to be kept in operating condition, it is up to the maintenance department to be up on its toes.

Ed Weitz is the plant engineer. I talked with him and W. L. Scott and R. E. Wetmore, supervisors in the electrical department, about their electrical situation.

They have quite an instrument group under the supervision of the electrical department. In it are some very clever radio engineers who are valuable in maintaining the various process instruments. They're also helpful on electronic controls, which are becoming numerous.

The electrical department has a say on some of the processes. Huge electric furnaces eat up plenty of power. Unless good scheduling is done, the demand charges would be prohibitive. So the electrical department controls some of the large operations, and in that way keeps the power bill down.

Some preventive maintenance is being done. Area maintenance with a large central group is a good setup for preventive maintenance, but Wet-

more recognizes that **equipment must be in fairly good shape before you can attempt to set up any preventive maintenance system.** A look-see at the central electrical shop shows motors being cleaned, painted with Glyptal, having new bearings installed, etc. When these motors go on the line, they will require a minimum of maintenance. Red Glyptal will show up dirt before it becomes a menace to the operation of the motor.

As I left the maintenance building, I couldn't help feel that **here was a maintenance organization that had demanded recognition by its performance.** Its new building was a symbol of that recognition by management.

But beyond the building, my talk with the men operating the maintenance department revealed that they had a very definite idea of a very tough maintenance problem. They were going to lick it by making sure that the equipment in their care was a little better every day than it was the day before. That, I think, is real maintenance.

• MANAGEMENT MORE RECEPTIVE TO ENGINEERS' IDEAS

Got a big kick out of the first Electrical Maintenance Workshop for Industry in Rochester, N.Y., this fall.

One session was a get-together of electrical operating men with top brass from industries around Rochester. Judging from the reactions of the crowd, management *is* interested in maintenance. I believe that most managements are much more inclined than they used to be to buy whatever their maintenance departments have to sell.

How much they will buy will depend upon how well maintenance men do their job of selling. The job is to do the selling in language that the top plant management will understand. So many times, the plant engineer's request for funds is turned down due to too many engineering details and not enough convincing information on: "How much is it going to save the company?"

• THREE HELPFUL NEW IDEAS IN ELECTRICAL EQUIPMENT

Here are some equipment ideas I picked up at the Electrical Maintenance Workshop for Industry, in Rochester:

An unusual motor starter seemed to be designed to please the maintenance man.

The solenoid coil has three connections, so it can be connected for either 110 or 220 volts. You can get another coil to handle either 220 or 440 volts. This two-in-one feature is dandy. How many times have you had to look for a 440 coil for a starter that was rated 220 volts!

The re-set button not only re-sets the overloads but actually mechanically opens the main contacts. Ever have contacts "freeze in" on a starter? Well, with this one you can open the contacts without having to run for the disconnect switch.

The reversing-type starters had electrical interlocks as standard equipment. This will prevent blown fuses when the mechanical interlocks break and both sets of contacts go in at the same time.

Stronger floor boxes to house receptacles under office desks were exhibited. They're made of real formed steel. The manufacturer told me that he had given up trying to make those floor receptacles smaller and smaller. Mabel always uses them for a footrest anyway. So why not make them strong enough to be stepped on without damage? I'll bet the use of these new boxes will cut down the number of trouble calls for electricians to repair outlets under the desks in your office.

A new pocket voltage tester that maintenance men should like was on display. The old type had sharp prongs that were always jabbing the electrician when he tried to put the tester in his pocket. The new one has grooves in which to insert the sharp points. This tester has another advantage: You can insert one of the points in a groove in the body of the tester so you use this point and the tester as one prod. Thus you keep the tester in easy view in one hand while reaching at a distance with the other hand.

There is certainly no excuse now for using lamp bulbs to check circuits.

• HAVE YOU DONE A GOOD LIGHTING JOB? THEN ENTER IT IN THIS CONTEST

Your plant may deserve a prize—in the contest being sponsored by the Industrial & Commercial Lighting Equipment Section of the National Electrical Manufacturers Association for outstanding lighting installations made between July 1, 1950, and December 31, 1951.

The contest has five separate competitions. One of these is for owners and users of industrial and commercial lighting installations.

Here is a contest right up your alley.

All awards will be made at the Fourth International Lighting Exposition and Conference to be held in Cleveland May 6-9, 1952. There will be $100 for the top five awards in each class.

In previous years, most awards in the industrial-commercial class have been won by commercial lighting installations. The main reason was that there were very few entries of industrial installations. That doesn't really make sense. As a rule, you plant operating men have much larger installations, and a greater variety to pick from, than the commercial people.

To enter the competition, write to the Merit Award Committee, Fourth International Lighting Exposition and Conference, Room 818, 326 West Madison Street, Chicago 6. Entries close January 31, 1952.

New Quiz Puts Zip Into Foreman Training Program

GOOD SUPERVISORY TRAINING is a never-ending job. Trouble is, it's hard to find new ways to keep driving home the same old ideas you have to harp on. Yet if you don't work some variety and interest into your training, you lose your audience.

The supervisory know-how quiz reproduced here is one answer to this all-too-common problem. It's being used by Maiden Form Brassiere Company, Bayonne, N. J., as the basis for informal discussions that don't "look" like training sessions at all. But they get the key points across in a novel and interesting way.

The quiz questions were developed by A. R. Lateiner, of The City College of New York. Lateiner, who is a consultant in supervisory training, worked out the "correct" answers to the questions in cooperation with Richard Geiger, Maiden Form's personnel manager. Here's how they used the quiz for training:

- All supervisors were called together in small groups to take the quiz. They were told results would *not* be used to rate them. To make this stick, they were asked not to sign names, and to keep papers for later discussion.
- After each group finished the quiz, "correct" answers were read off, and supervisors scored their papers themselves.
- Several meetings followed, in which pro's and con's of "correct" answers were discussed by small groups. Each meeting lasted about one hour.
- At the end of the third session, each man was asked to turn in a written report on an actual incident illustrating one of the 50 answers. Some of these were selected for discussion, too.

Results: Review of the "same old thing," but with a big difference. Supervisors got a kick out of the new approach, enjoyed discussing and arguing differences of opinion. Everybody participated heavily. But nobody was particularly conscious of "being trained."

First, read the statement at the left, below. Answer yes, no, or ? (uncertain). "Correct" answers, as read to supervisors in conferences, are on the right.

1 **Consult with your workers on tough jobs.**

YES ☐ ? ☐ NO ☐

1 Yes. Three reasons: (1) You may get valuable ideas from them. (2) Develops better understanding and interest. (3) More willing cooperation will be developed by consultation.

2 **How long a worker is absent is more important than how often.**

YES ☐ ? ☐ NO ☐

2 No. Long absence may be readily justified by illness. But frequent absenteeism requires investigation, as it may be a sign of improper attitude. Also, it's harder for management to take care of frequent absences.

3 **Observing safety rules is up to the worker.**

YES ☐ ? ☐ NO ☐

3 No. Supervisor has greatest authority and opportunity. So he is responsible for the observance of all rules, including safety rules.

4 **If an employee has an angry complaint, walk away from him.**

YES ☐ ? ☐ NO ☐

4 No. Try to arrange for a private session. Be a sympathetic *listener*. Let the worker get the grievance off his chest.

5 **Train a worker for speed and then pick up his errors.**

YES ☐ ? ☐ NO ☐

5 No. Worker should learn to do it correctly in the beginning, and combine speed with accuracy. Speed will come afterwards if the worker does it right. Having a quota or goal helps learning.

6 **Foremen are judged entirely on their group's production.**

YES ☐ ? ☐ NO ☐

6 No. Production is important. But helping another department to the advantage of the over-all company job is valued by management. Coordination and cooperation are basic.

7 **Never make an exception to a company rule.**

YES ☐ ? ☐ NO ☐

7 No. Special conditions require special handling. Emergencies, new problems, call for consulting with supervisors. Use of judgment to call for help is a sign of sound supervision.

Turn to page 126

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ARE YOUR BEST POWER BUY— AT ANY PRICE

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Philadelphia 2

Exide Batteries of Canada, Limited, Toronto

"Exide-Ironclad" *Reg. Trade-mark U. S. Pat. Off.*

8 **A worker's personal life is of no interest to a supervisor.**

YES ☐ ? ☐ NO ☐

8 No. Attitude, health, absenteeism, and other problems caused by off-the-job factors affect on-the-job performance. Understanding leads to better solutions.

9 **Give workers advance notice of changes.**

YES ☐ ? ☐ NO ☐

9 Yes. Avoids that "pushed-around" feeling. Fosters good mental adjustments. May bring out helpful ideas or suggestions.

10 **Look the other way when first violations occur.**

YES ☐ ? ☐ NO ☐

10 No. Pattern becomes set, with anger at later correction. Wrong physical habits may develop. Toleration implies approval: others may follow bad example. Prompt correction easier.

11 **A fast learner makes a good worker.**

YES ☐ ? ☐ NO ☐

11 No. Not necessarily. Slow learner may become good, steady, dependable employee. Fast learner may be sloppy, temperamental, undependable. Learning speed *is* important, though.

12 **Favorite workers should get the "breaks."**

YES ☐ ? ☐ NO ☐

12 No. Favoritism charges make for poor morale. Spread the breaks by rotation. Keep a record. Inform group of action taken.

13 **New employees learn best by just watching.**

YES ☐ ? ☐ NO ☐

13 No. Old-fashioned method. Use JIT 4-step method to make learning easier: Prepare—Present—Apply—Test.

14 **Workers should ask questions about the job.**

YES ☐ ? ☐ NO ☐

14 Yes. You work better when you know why. Throw out top-drawer secrets. Workers are entitled to know.

15 **Supervisors should interfere in worker's arguments.**

YES ☐ ? ☐ NO ☐

15 Yes. Try to promote group harmony. Discipline where necessary. Arguments affect work. To moderate, use on-the-job control.

16 **Consider transfer of unhappy but capable workers to other jobs.**

YES ☐ ? ☐ NO ☐

16 Yes. Retain good employees by trying to place them elsewhere if unhappy. Personality difficulty or job clash should not be allowed to ruin good employee for company.

17 **Slow workers should be threatened with dismissal.**

YES ☐ ? ☐ NO ☐

17 No. Look for reason behind "slow" work. Concentrate on encouraging effort, skill, better attitudes.

18 **Train a capable worker to cover your job.**

YES ☐ ? ☐ NO ☐

18 Yes. When you are ill or called away, work won't suffer. Frees you for better opportunity or promotion. Encourages your subordinates.

19 **If a gripe is too lengthy—cut it short.**

YES ☐ ? ☐ NO ☐

19 No. A full hearing is vitally important. Helps griper to get chance to "unload." Important information often comes out of tale of woe.

20 **Supervisor is responsible for employee's comfort and health on job.**

YES ☐ ? ☐ NO ☐

20 Yes. To some extent—conditions on job, such as drafts, housekeeping, sanitation, and hazards. Also, supervisor should recognize obvious illness, to protect other workers, prevent contagion.

21 **Supervisor should be blamed for accidents.**

YES ☐ ? ☐ NO ☒

21 No. Recurrent accidents are not intentional. Supervisor is *responsible*. That is, he is accountable to take precautions, investigate, instruct, anticipate, provide for control. But that's not the same as "blame."

Turn to page 128

4,000,000 POUNDS OF WELD METAL...

No shutdown in 2 years!

In two years' continuous operation on a three-shift basis, these 116 A.O. Smith Heavy Duty AC Welding Machines on this auto frame line have set an amazing record of *dependability in production.* Designed and built for extreme requirements, they have accumulated nearly 15,000 hours per machine—a rugged *in-service* life-test at duty cycles up to 82%!

More than 1,000,000 auto frames were built in this period . . . more than 4,000,000 pounds of weld metal deposited by the Welding Machines shown here—*without a shutdown* caused by welding equipment failure!

The A. O. Smith Heavy Duty AC Welding Machine has *proved in use* that it will stand up under service which punishes most welding machines. We rely on it to turn out thousands of tough welding jobs—from truck frames to giant pressure vessels.

And you can rely on it for long, trouble-free service, power savings, easy operator acceptance. But *you* be the judge . . . try the welder MADE *BY* WELDERS *FOR* WELDERS.

WRITE, WIRE or PHONE for the name of your nearest distributor.

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A.O.Smith

AC WELDING MACHINES

P.O. Box 584, Milwaukee, Wisconsin

A. O. Smith CERTIFIED Welding Electrodes —the standard of dependability since World War I

22 **The best worker makes the best foreman.**

YES ☐ ? ☐ NO ☐

22 No. Because supervisory qualities include skill in dealing with people, ability to plan, instruct, improve methods, keep records, accept responsibility, and cooperate with others.

23 **If you can't settle matters with a worker, take him to your boss.**

YES ☐ ? ☐ NO ☐

23 Yes. Appeal procedure up the line. Prevents by-passing. Worker will go through you if he isn't forced to go around you.

24 **Buy your boys a beer after work.**

YES ☐ ? ☐ NO ☐

24 No. Usually breeds feelings of favoritism because of association with a certain few. Friendliness is good, but be friendly to all.

25 **Give your opinion on worker's personal problems.**

YES ☐ ? ☐ NO ☐

25 No. Counsel, ask questions to guide worker to self solution. Sympathize, provide factual information, such as name of social agency.

26 **Most accidents are unavoidable.**

YES ☐ ? ☐ NO ☐

26 No. About 98% are avoidable in theory. Over 60% are avoidable in actual practice in a reasonable way in an average plant. Proved by industrial accident surveys and researches.

27 **Workers want only the cash, not the credit or praise.**

YES ☐ ? ☐ NO ☐

27 No. Workers want satisfaction with own boss, good working locality and conditions, security, and advancement.

28 **What a worker thinks is as important as what he does.**

YES ☐ ? ☐ NO ☐

28 Yes. Workers' thoughts can close a plant, demoralize, create friction, lead to strikes.

29 **The supervisor should stand up for the worker.**

YES ☐ ? ☐ NO ☐

29 Yes. Supervisor is in middle. He represents management to worker and worker to management. He must balance the pressure. This develops loyalty, teamwork, and high morale.

30 **An employee usually understands the importance of his job.**

YES ☐ ? ☐ NO ☐

30 No. Not in relation to the over-all picture. Supervisor must educate worker to the importance of his own job.

31 **After reprimand, be tough with the offender.**

YES ☐ ? ☐ NO ☐

31 No. Opposite is true. Otherwise worker feels you bear grudge.

32 **Intelligent workers are bored with simple jobs.**

YES ☐ ? ☐ NO ☐

32 Yes. Intelligent, alert workers should be given a chance at more complicated work that challenges their ability, provides interest, bars monotony, fatigue.

33 **Each worker should develop his own basic work methods.**

YES ☐ ? ☐ NO ☐

33 No. Workers need standard procedures, so the left hand knows what the right hand is doing. "One best way" should be prescribed and followed. But individual improvements should be considered for company-wide standards.

34 **Experienced workers welcome honest criticism.**

YES ☐ ? ☐ NO ☐

34 No. It's human to resist and resent correction unless approach is skilled and tactful.

35 **Supervisory skills can be learned.**

YES ☐ ? ☐ NO ☐

35 Yes. They're not "instinctive," and some people have special aptitudes. But everyone can improve knowledge and understanding of supervisory skills, and develop ability by *doing*.

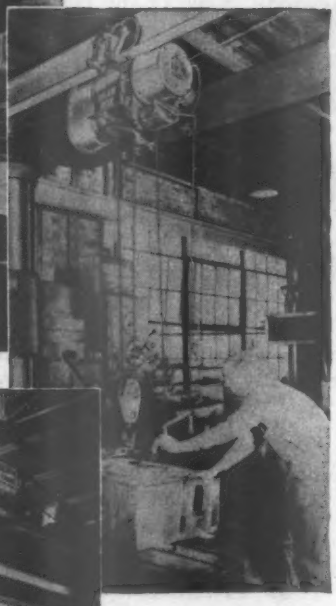
36 **Employees should know more about the company and the product.**

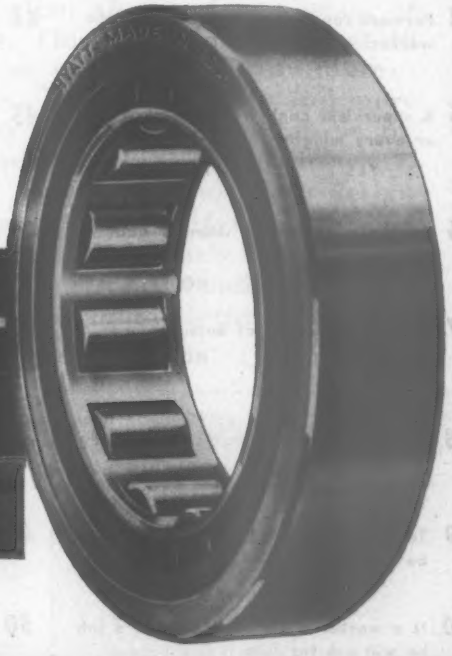
YES ☐ ? ☐ NO ☐

36 Yes. Very important. Develops pride of work, pride in job and product. Seeing job in relation to whole picture makes employees better able to do best work.

Turn to page 130

HYATTS for more efficient materials handling





Modern methods of materials handling are cutting production costs and increasing capacity—with Hyatt Roller Bearings greatly contributing to this new efficiency.

The leading manufacturers of cranes... tractors... trailers... hand and power trucks... casters... conveyors... hoists and portable handling equipment, who "build in" Hyatts, know that faster, smoother, carefree and more economical operation are assured with these better bearings.

That's why it pays to look for Hyatts in the specifications of the equipment you buy because it means built *first* to serve and *last*. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

HYATT ROLLER BEARINGS

37 **Supervisors should admit to errors.**
YES ☐ ? ☐ NO ☐

37 Yes. Gets these results: Eliminates grapevine snickers; sets example for workers to admit errors; reduces damage as soon as possible. Workers respect a supervisor willing to admit he's not perfect.

38 **Be willing to lose your best worker to a better job.**
YES ☐ ? ☐ NO ☐

38 Yes. It's only fair to the capable person. And it encourages the rest of group to do their best. You lose one person and gain loyalty and effort of rest of group.

39 **Men make better supervisors than women.**
YES ☐ ? ☐ NO ☐

39 No. Not proved. Some of the best supervisors in plants have been women.

40 **Always let a worker know when he starts "slipping."**
YES ☐ ? ☐ NO ☐

40 Yes. It's fair, gives person chance to correct himself. Becomes part of history that may justify further action if needed. Prevents blow-ups, too.

41 **A good boss is always a pal to the worker.**
YES ☐ ? ☐ NO ☐

41 No. Some occasions demand stern and serious treatment. Actions of workers don't always call for friendly treatment. Even parent sometimes has to discipline child, and outsider wouldn't call it "friendly."

42 **The most-educated workers make the best employees.**
YES ☐ ? ☐ NO ☐

42 No. Education often helps. But, depending on the job, other factors are equally or more important: reliability, dexterity, for example.

43 **Turn new employees over to a good worker for training.**
YES ☐ ? ☐ NO ☐

43 No. Training is supervisor's responsibility. Cannot be entirely delegated. Co-workers can give an assist.

44 **Foremen represent management to the worker.**
YES ☐ ? ☐ NO ☐

44 Yes. They are the contact.

45 **A supervisor can't watch every worker every minute.**
YES ☐ ? ☐ NO ☐

45 Yes. Wouldn't be good if supervisor could. Pattern of habits or trends of work can be watched and controlled. But there would be no room for initiative if supervisors watched every move.

46 **People work better when a goal is set.**
YES ☐ ? ☐ NO ☐

46 Yes. Worker has feeling of accomplishment if he hits goal incentive.

47 **No one likes a strict boss.**
YES ☐ ? ☐ NO ☐

47 No. Strict boss who is fair, friendly, but firm is most respected. Consistency of supervisor's behavior sets definite standards for group.

48 **A majority of my workers are very stupid.**
YES ☐ ? ☐ NO ☐

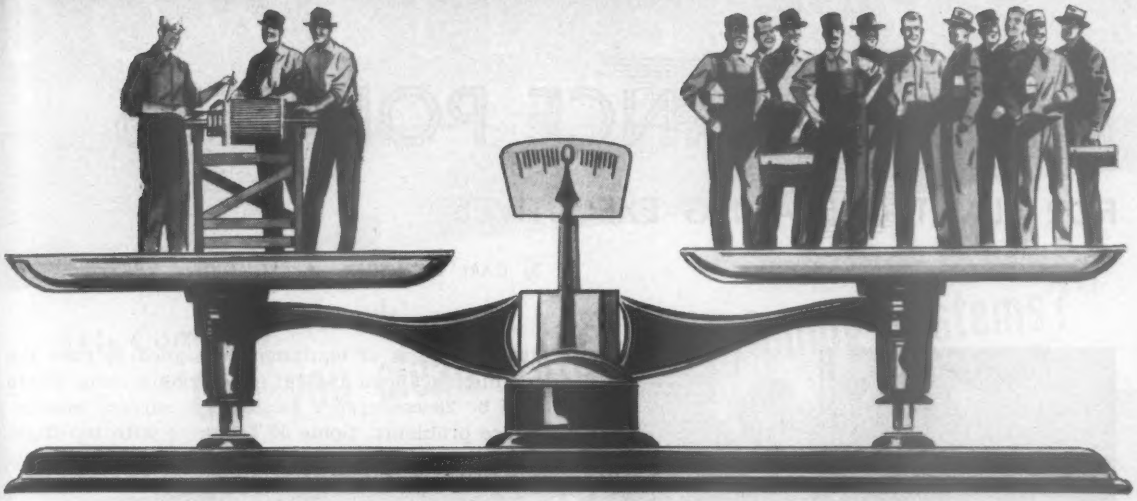
48 No. If that seems to be so, means supervisor hasn't done his job. It's an alibi for poor supervision.

49 **Telling a worker once or twice should be enough.**
YES ☐ ? ☐ NO ☐

49 No. Repeat a dozen times if necessary. Did you learn first or second time?

50 **If a worker doesn't understand a job he will ask for help.**
YES ☐ ? ☐ NO ☐

50 No. Workers often bumble along and bluff through, or get advice from wrong people. They don't want to show lack of knowledge, or admit need for help.



$370 INVESTED IN SILICONE INSULATION SAVES $80,000 IN MAN-HOURS ALONE

TRAVELLING CRANE MOTORS insulated with Class B materials had a normal life expectancy of only 20 days in a large southern foundry. At least 2½ to 3 hours were required to change motors. Down-time cost $1000 an hour in lost man-hours or $2500 for each failure. That amounts to over $40,000 a year in lost man-hours alone.

OVER TWO YEARS AGO, three crane motors, rated at 15, 30 and 50 hp, were rewound with Silicone (Class H) materials at an additional cost of about $370.00. Still in service, those Class H motors have already saved $80,000 in labor plus the cost of rewinding with Class B materials plus the value of lost production.

THAT'S TYPICAL of the performance of motors protected with Class H insulation made with Dow Corning silicones. They last at least 10 times longer than the next best class of motors. They also have at least 10 times as much wet insulation resistance. That's why more and more military and industrial engineers are demanding Class H equipment. That's why more and more design engineers are specifying Class H equipment. And that's why Class H is becoming more readily available from motor manufacturers and rewind shops.

WRITE, RIGHT AWAY

to DOW CORNING CORPORATION, MIDLAND, MICHIGAN

Please send me ☐ List of Class H Motor Manufacturers L-12A
☐ List of Class H Rewind Shops L-12B

Name_____

Title or Dept._____

Company_____

Address_____

City_____ Zone_____ State_____

VISIT OUR BOOTH PLANT MAINTENANCE SHOW PHILA. JAN. 14-17

FIRST IN SILICONES

DOW CORNING CORPORATION

MIDLAND, MICHIGAN

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In CANADA: Fiberglas Canada, Ltd., Toronto • In GREAT BRITAIN: Midland Silicones, Ltd., London

MAINTENANCE POINTERS

FOR PLANT OPERATING EXECUTIVES

By CARL G. WYDER • Maintenance Editor, FACTORY

Using machine to measure belt length will . . .

. . . Match Multiple V-Belts for Better Results

To get maximum power and uniform wear out of your V-belts, they should be micrometrically machine-matched. In multiple V-belt transmission, power is lost and belts are overloaded if one or more of them is longer than the rest. Belts wear out faster, too.

Although some manufacturers pre-stretch their cord and air-condition their base material, belts are subject to temperature and humidity changes. These changes cause the belt to stretch or shrink.

Such a tester as the one shown above will tell you if your belts are exactly the same length and if you're getting the maximum power and life out of them. The one shown here is being used by Republic Supply Company of California, Los Angeles.

How You Can Solve That Tough Maintenance Problem

Are you going to the third annual maintenance show? You better, if you don't want to miss the best concentration of information on plant maintenance ever programmed. It will be held at Convention Hall, Philadelphia, on January 14 to 17.

Look at these highlights. There will be about 225 exhibitors of equipment designed to ease the maintenance load and cut maintenance costs. There will be 28 conference sessions on current maintenance problems. Some 55 speakers with top-flight experience in their fields will post you on latest practices, and answer all your questions.

Among the new features this year will be a general session solely on maintenance costs—and another on preventive maintenance. You can pick your plant size in five separate sessions for discussion of maintenance problems. There's also a choice of industry sessions. And you'll be able to take your hair down at any one of 15 round-table sessions that are strictly off-the-record.

Got a manpower training problem, a problem in lubrication, building maintenance, or safe operation? Want to know how to prepare projects, improve paperwork, reorganize personnel? These will be covered.

Say, there just isn't room to tell you all. For a complete program and registration information, write Clapp & Poliak, Inc., 341 Madison Ave., New York 17.

Time Clocks a Headache? Here's a Simple Solution

Are you troubled with keeping electric indicating clocks, time clocks, and time recorders at the correct time—all the time? Someone's always shutting off the clock circuits. Errors in time can lead to bad labor troubles.

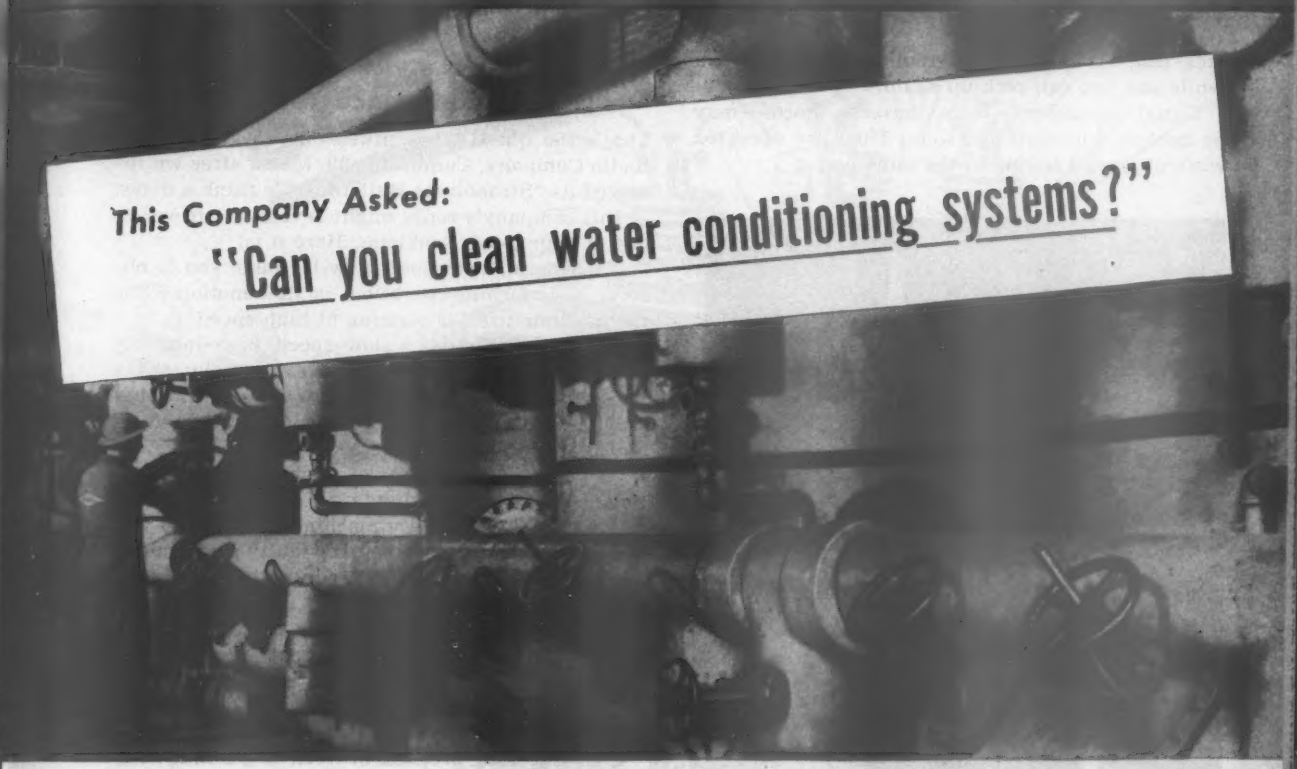
To insure against the wrong time, the traditional way was to run all such devices on a separate circuit operating off a master clock. The necessary wiring was complicated. And the wire is hard to get today.

But one manufacturer has eliminated the wiring problem by using carrier current. In this type of control, a low-range audio-frequency (3500 cycles) is superimposed on the a-c power line of the time-recording system. The signal, initiated by the master control clock, is carried to an electronic transmitter. This superimposes it on the a-c circuit.

Your clocks just can't tell the wrong time—if the power stays on. If it should go off, a wide range of correction is available. On the indicating clocks, the range is 59 minutes slow to 55 minutes fast. On self-regulating minute-impulse equipment, the correction is from 20 minutes slow to 10 min-

DOWELL SERVICE

CHEMISTRY APPLIED TO MAINTENANCE CLEANING PROBLEMS



Dowell Service has cleaned many types of water supply equipment FAST!

If deposits are cutting production and profits in your plant . . . Dowell Service offers an effective remedy! For example, in water supply and water treating systems, deposits may accumulate in pipes, pumps and filters . . . impairing operating efficiency. Maintenance men in many industries rely on Dowell Service to clean operating equipment . . . *without dismantling and with a minimum of downtime!*

Experienced Dowell engineers do the job, using Dowell-designed, truck-mounted equipment. Liquid solvents designed to remove deposits quickly, efficiently and economically are applied according to the techniques demanded by the job: for example, by filling, spraying, jetting, cascading or vaporizing. Often equipment can be cleaned in operation.

Let Dowell Service *save you time and money* in your maintenance cleaning! Call the nearest Dowell office today for FREE consultation.

Recent Dowell jobs in Feedwater Systems

SCREEN FILTERS: In less than three hours, Dowell Service removed 90% of deposits from filters used to screen river water for a 48″ strip mill.

WATER SOFTENER: Approximately 18 inches of hard calcium carbonate piled up in the bottom of a water softener's deaerating compartment. In less than one day, Dowell Service thoroughly cleaned compartment.

FILTER BEDS: The backwash rate on an anthracite filter was reduced to 75 gallons per minute by accumulated deposits. After Dowell Service, backwash rate was increased to an effective 385 gallons per minute.

ION EXCHANGE BEDS: Iron oxide clogged an ion exchange water softener. Before cleaning, two pumps were required to provide pressure for adequate back wash. After Dowell Service, one pump was sufficient.

FEEDWATER LINES: Before cleaning, it was necessary to use three 100 horsepower pumps to force water through clogged feedlines to a boiler house. Following Dowell Service, only one pump was required.

PUMP: Two high pressure feedwater pumps were nearly clogged with deposits. Dowell service completely cleaned them along with rest of the feedwater system.

WATER WELL: Before treatment, a water well produced only 108 gallons per minute with a 35′ drawdown. After Dowell acidizing, water flow increased to 450 gallons per minute with a 27′ drawdown.

DOWELL INCORPORATED • TULSA 1, OKLAHOMA

CALL

New York 20, Boston 16, Philadelphia 2, Baltimore, Wilmington 99, Richmond 19, Jacksonville 2, Buffalo 2, Cleveland 13, Pittsburgh 19, Detroit 2, Chicago 4, St. Louis 8, Kansas City 8, Wichita 2, Oklahoma City 2, Houston 2, New Orleans 12, Ft. Worth 2, Shreveport 69, Atlanta, Indianapolis, Louisville, Upper Montclair, N. J., Anniston, Alabama, Hattiesburg, Miss., Lafayette, La., Mt. Pleasant, Mich., Hamilton, Ohio, Charleston, W. Va., Salem, Illinois, Beaumont, Texas, Borger, Texas, Midland, Texas, Wichita Falls, Texas, Hobbs, N. Mex.

★ *Maintenance cleaning service for industrial heat exchange equipment.*
★ *Chemical services for oil, gas and water wells.*
★ *Magnesium anodes for corrosion control.*

DOWELL

A Service Subsidiary of
THE DOW CHEMICAL COMPANY

utes fast. So you see, current can be off for a while and you can pick up again.

Signal equipment—bells, buzzers, horns—may be hooked into such a system. They are operated without special wiring in the same way.

With 68 power amplifiers, Lockheed finds . . .

. . . Refrigerated Amplifier Room Lengthens Tube Life

The amplifier room for your plant's loudspeaker system may not be as large as Lockheed Aircraft Company's, but what the Lockheed people found out about longer tube and electrolytic condenser life may interest you.

Temperature in the amplifier room used to get up to 130F. Two refrigeration units now keep the temperature at about 70F. Lockheed's 68 50-watt amplifiers used to need new 6L6 and 5Z3 tubes every six months. In the cooled rooms, only about 25% of the tubes are replaced each year.

Electrolytic condensers had a life expectancy of one to three months before. Now, they last two years, on the average.

Lockheed picked up two small refrigerator units (used to be used to preserve food). The installation was simple. Just two radiators using fan circulation is all there is to it. It's the brain-child of A. Paul, Jr., head of the electronics department.

► **If your plant throws away a lot of used lubricating oil, look into reclaiming it.** The United States Air Force sends its used oil to contractors for re-refining, recovers about 72% in good oil.

Is a Stroboscope a Good Maintenance Tool?

That's the question we asked one day of General Radio Company, Cambridge 39, Mass., after we received its "Strobolume Bulletin." We think a digest of this company's reply might reveal an answer to one of your tough problems. Here it is:

"In general, a stroboscope will enable you to observe any machine operations in slow motion while the machine itself is running at high speed.

"The Strobolume is a slow-speed, high-intensity stroboscope. It has the same uses in maintenance for low-speed machinery that our other stroboscopes, such as the Strobotac, have in the maintenance of high-speed devices.

"Among the many uses of stroboscopes in maintenance are the following:

"1. Location of noisy machine parts
"2. Location of parts causing faulty performance
"3. Measurement of belt slip
"4. Checking wear of gears
"5. Watching spring action to locate defects
"6. Watching mechanisms of cutting and grinding operations to locate sources of faulty work
"7. Maintenance of proper adjustments
"8. Checking progress of work in grinding commutators
"9. Timing of loom shuttles
"10. Inspection and adjustment of color register in printing."

If You Can't Afford a Waste-Disposal Plant . . .

. . . group action may be the answer. F. B. Besselievre, chief sanitary engineer for the Dorr Company, Stamford, Conn., tells you how it works.

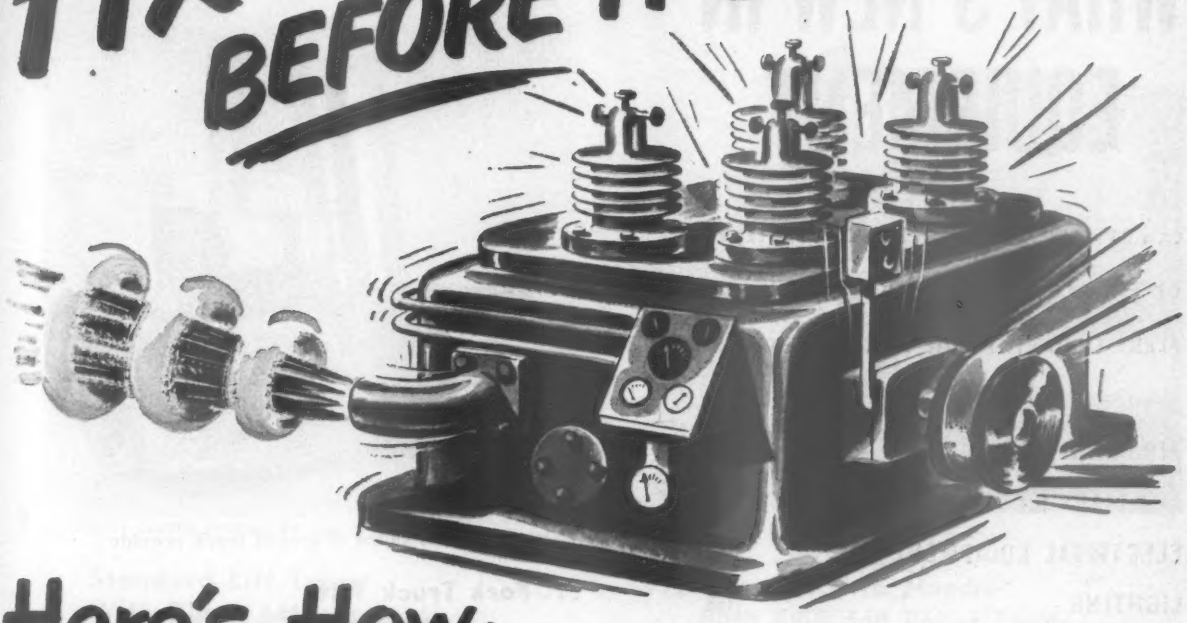
First, interested plants in a locality make individual waste-disposal studies. Then follows the group action.

These plants figure on combining wastes and waste treatment. They share the cost of building a waste-disposal plant and maintaining it. Sometimes joint study may even show that adjacent acid and alkaline wastes may neutralize each other, and can be dumped together into streams with little or no treatment.

There's still another advantage to the group plan. It encourages local opinion in favor of the industries and their public spirit. A combined step of this kind will probably be more widely advertised and spoken of than individual action by single plants at different times.

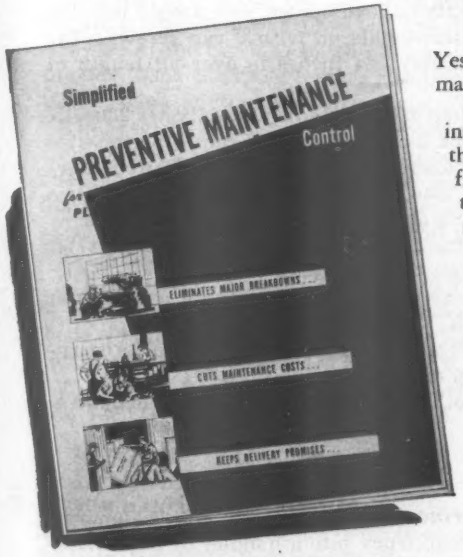
Turn to page 226 for good ways to solve special plant engineering problems.

FIX IT... BEFORE IT BREAKS!



Here's How:

Scheduled Preventive Maintenance Controlled by KARDEX VISIBLE RECORDS!



SEND FOR YOUR FREE COPY TODAY!

Yes, with a Kardex Visible system, you review and *control* your preventive maintenance schedules... *at a glance!* Here's how the system works—

Experience and performance are combined to set up a pre-arranged, tested, inspection schedule. Kardex colored signals indicate . . . *automatically* . . . those items due for inspection. A "Floating Inspector's" record is withdrawn from the Kardex pocket, filled out with instructions specific to the checkup to be performed, and routed to your maintenance men as a work order and report sheet.

When the maintenance job is complete, the maintenance man checks off what he did and the card is returned to its place, *automatically* signaling job completion. Then, the Kardex signals are advanced to the next date specified. Details are posted on the maintenance card from the job card, providing a continuing, *permanent* record of maintenance activity.

The quick result: needless, costly "down-time" is eliminated; operating efficiency goes up; manufacturing costs go down — all accomplished with *less* clerical help and a minimum of time-wasting paper work, thanks to the "floating" maintenance order!

You'll find valuable information in *SIMPLIFIED PREVENTIVE MAINTENANCE CONTROL,* just published by Remington Rand to help you. Too, you'll learn of the profit-building advantages in controlling plant inventories with Kardex *simplified* property records.

To establish, once and for all, complete control over your maintenance activity and to hold inventories at a healthy, low level, write for your copy *today!* Ask for KD-449, *SIMPLIFIED PREVENTIVE MAINTENANCE CONTROL.* Address: *Management Controls Reference Library,* Room 1533, 315 Fourth Avenue, New York 10.

Remington Rand INC. **THE FIRST NAME IN BUSINESS SYSTEMS**

WHAT'S NEW IN EQUIPMENT

. . . BRIEFED HERE FOR THE CONVENIENCE OF PLANT OPERATING MEN IS INDUSTRIAL PLANT EQUIPMENT NOW ON THE MARKET . . .

AIR CONDITIONING 148
AUXILIARY EQUIPMENT 150
ELECTRICAL EQUIPMENT 162
LIGHTING 168
MAINTENANCE TOOLS & SUPPLIES 170
MATERIALS HANDLING ..... STARTS HERE
MEASURING & CONTROL 176
PLANT HOUSEKEEPING & SANITATION 180
SAFETY 186
VALVES, PIPING & ACCESSORIES 188
MISCELLANEOUS 192

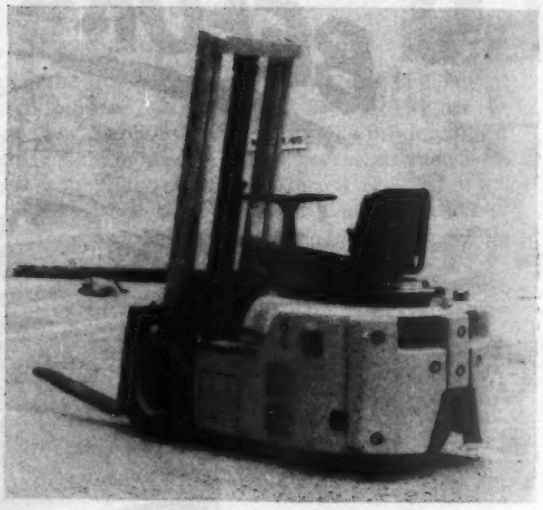
IN THE NEXT ISSUE ..... **Some notes on important late items. More about them next month.**

Materials Handling System built around a tote box gives you an integrated system for moving small parts. Conveyor adapters, dollies ,and jack lift trucks are specially designed to move the tote boxes around production area and stores.
Charles William Doepke Mfg. Co., Rossmoyne, O.

Wire Baskets for carrying precision parts in production have custom-made inserts that will handle any shape or material.
Wire & Iron Products, Inc., 1725 16th St., Detroit 16.

Efficient Respirator protects workmen from radio-active dust as fine as 3/10 micron in size.
Mine Safety Appliances Co., Braddock Thomas, and Meade Sts., Pittsburgh 8.

New Attachments



1 **Counterweights added to rear of truck provide . . .**

. . . Fork Truck With Adjustable Capacity

You can adjust the counterweights of this Hyster truck to suit the handling job. It's all done with a 3-piece counterweight that you fasten to the tail of the truck.

This extra weight is in addition to the truck's regular counterweighting. When you want to increase capacity or load center, you simply bolt the added counterweights on with 8 cap screws. The weights add only 2¼ inches to over-all length of the truck.

The addition of the weights to the Hyster 2000-lb. fork lift truck increases the load center permissible for capacity load from 15 to 24 inches. The counterweights will also increase the truck's load capacity a corresponding amount for any given load center.

These extra counterweights, explain the Hyster people, permit the truck user to:

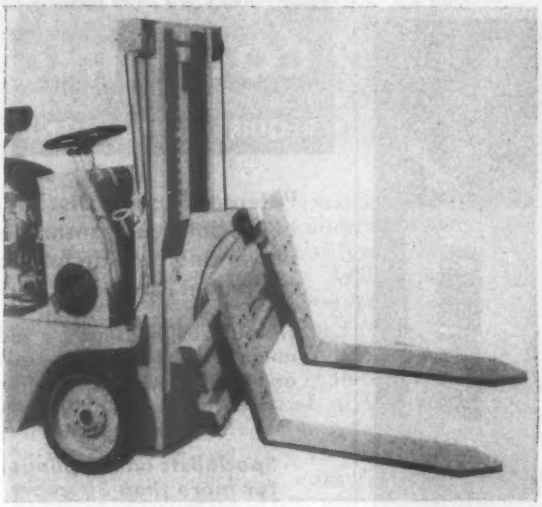
- Select the right counterweight for a particular handling job.
- Cut fuel and maintenance costs of trucks carrying less than capacity load.

Hyster Co., 2902 N.E. Clackamas St., Portland 8, Ore.

■

4 **A SELF-DUMPING HOPPER** converts the Kalamazoo flat-bed pickup truck into a handler of bulk materials. Hopper has a capacity of ½ cubic yard and can be discharged by the seated driver. You can quickly bolt the hopper frame to the freight-carrying platform of its gasoline-powered truck, according to the Kalamazoo Mfg. Co., 1827 Reed St., Kalamazoo 24F, Mich.

That Add Flexibility to Industrial Trucks



2 Rollover clamp forks give you a . . .

. . . Standard Lift Truck With Dump Attachment

This Baker Rollover-Clamp triples the functions of a standard fork truck. You can use the forks to handle pallet loads of material in the conventional manner. But the forks also rotate. So you can dump castings, scrap, or other bulk materials from skid boxes or bins.

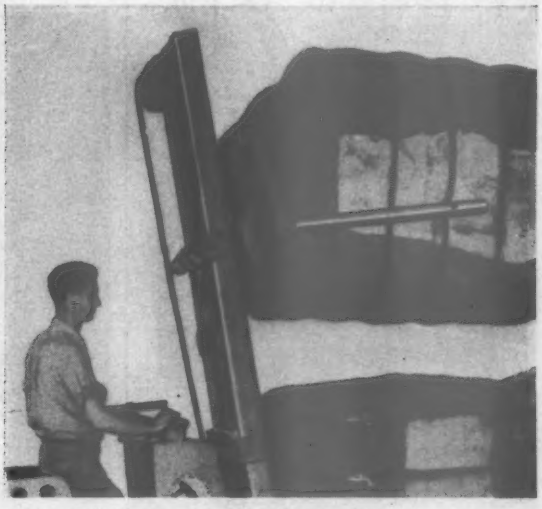
And finally you can use the forks as clamps for handling miscellaneous objects. The forks move sidewise in the carriage to grip bales, cartons, and the like. This clamping feature also lets you adjust fork spacing to other sizes of pallets.

The result is a fork truck that can switch rapidly from one job to another without time-consuming changes or adjustments. For instance, in scrap handling one truck can pick up skids of scrap, dump the scrap into a baling machine, and then pick up the finished bales.

The Rollover-Clamp fits the standard Baker 4000-lb. fork truck. The attachment will handle 2400-lb. loads, 48 inches long. The truck itself has a tiering height of 126 inches, a nested height of 83 inches.

The Baker-Raulang Co., Baker Industrial Truck Div., 1250 W. 80th St., Cleveland 2.

■



3 Universal clamp attachment permits . . .

. . . One Truck to Handle Both Bulk and Pallet Loads

You can use the lift arms of this fork truck attachment as pallet forks or clamp. They will handle pallet and skid loads as well as rolls, bales, and similar bulk items. The attachment is designed for the Spacemaster line of gasoline and electric fork trucks.

When used as a standard fork truck, it will handle boxes, cases, or unit loads on bins, skids, or pallets. Maximum capacity is 1700 pounds on a 48-in. pallet.

When the arms are used as side clamps they will handle rolls and bales weighing up to 1400 pounds. The clamp forks are operated by two hydraulic rams fed by the main hydraulic system of the truck. Fork spread can be adjusted within a range of 18 to 46 inches, or 23 to 60 inches, depending on the nature of the materials to be handled.

The hydraulic side clamping action is controlled by a deadman-type control. So the arms are held clamped in any position of closure.

For complete details on the Universal Clamp and Spacemaster trucks write for company bulletin.

Lewis-Shepard Products, Inc., 192 Walnut St., Watertown 72, Mass.

■

5 **A DRUM-HANDLING ATTACHMENT** that fits any make lift truck and any size drum is made by Marvel Industries, Inc., 2224 Cleveland St., Evanston, Ill. Unit has no prongs, platform, or clamps. A special hook automatically grips the top rim of the drum when truck lift is raised. You can put it on, take it off your fork truck in a few minutes. Capacity, 1000 pounds.

6 **PLATFORM ADAPTER** made by Towmotor Corp., 1226 E. 152nd St., Cleveland 10, changes its electric pallet truck into a platform truck. The steel framework platform adds extra height to the forks to permit efficient handling of platforms, skids, and tote boxes. When not in use the platform hinges out of the way. So you can use the same truck to carry pallets, too.

Turn the page

Textile processors will recognize this unique belt as part of a Bale Breaker . . . the device that rips apart bales of raw fibre for processing. Heretofore, it has consisted of a series of steel spikes mounted on canvas belting. However, the spikes often strike stones, bits of metal or other foreign objects inside the bale, causing sparks that ignite flash fires that burn the belt itself.

Cambridge design engineers solved this problem by attaching metal spikes to a standard *woven wire* conveyor belt. Results: fewer fires because Monel metal spikes reduce sparking, no belt damage or repairs when fires do occur, water from sprinklers will not harm the belt, longer belt life from all-metal construction.

This is a typical example of the many unusual or difficult problems solved by the use of Cambridge woven wire conveyor belts. Cambridge belts can be constructed from any metal or alloy in a wide range of open or closed weaves. For any problem of combining product movement with processing through heat, cold or corrosive agents, rely on the experienced advice of your Cambridge Field Engineer. Write direct or see "Belting-Mechanical" in your Classified Telephone Directory.

FREE CATALOG gives belt specifications, construction features, engineering data and conveyor design for many plants including food, ceramic, chemical, metal-working and others. WRITE TODAY FOR YOUR COPY of this valuable reference.

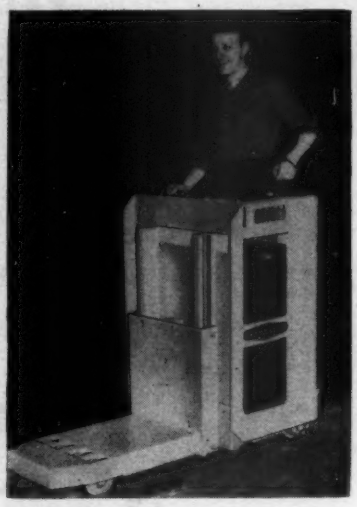
The Cambridge Wire Cloth Co.
Dept. E • Cambridge 12, Md.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

MATERIALS HANDLING EQUIPMENT

Begins on page 136



Low-Lift Platform Truck

This electric platform truck will move and spot skid loads around the plant. Known as the Raymond Low-Lift, it has a capacity of 4000 pounds. Unit is powered by a 12-volt, 400 amp.-hour battery.

The Low-Lift has patented offset drive and stabilizing casters. These features, says the manufacturer, permit right-angle turns from aisles narrower than the combined length of truck and load.

You can get a Low-Lift in three lowered heights—6, 9, and 11 inches. Platform lift is 4 inches. There are two platform widths—18 and 24 inches. Standard platform lengths are 30, 36, 42, and 48 inches. Truck speed is 5 mph. loaded, 6 mph. empty. Rubber-tired wheels are standard equipment.

Raymond Corp., 3284 Madison St., Greene, N. Y.

Turn the page

Cash in your Scrap!

19-million pounds of non-production scrap in 10 weeks. That's General Motor's score. How much have you found?

THOMAS
Flexible ALL METAL
COUPLINGS
FOR POWER TRANSMISSION
REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for misalignment and end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:
½ to 40,000 HP
1 to 30,000 RPM

Specialists on Couplings for more than 30 years

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

NO MAINTENANCE PROBLEMS.

ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

YOU CAN'T RISK FIRES NOW!

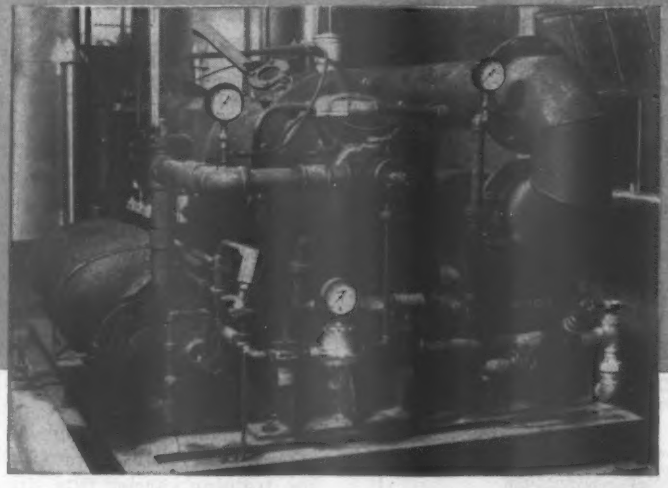
Today's urgent production demands can tolerate no unwarranted risk of interruption by explosions which might cause even small fires or other plant damage. Against such hazards, R-C Inert Gas Generators provide positive, economical protection.

This protection is essential in plants where inflammable gases, liquids, explosive dusts and other dangerous materials are handled, processed or stored. Available either in stationary or mobile units, R-C Inert Gas Generators greatly reduce the risks from fires caused by explosions. They are compact, simple and sturdy in construction and operate at extremely low cost. Available in capacities from 1,000 to 35,000 cfh.

If your operations involve materials or processes which might cause explosion-produced fires, investigate the protection afforded by R-C Inert Gas Generators. Installation costs in many cases can be offset by insurance savings. Ask us for details.

ROOTS-CONNERSVILLE BLOWER CORPORATION
510 Central Avenue, Connersville, Indiana

Portable R-C Inert Gas Generator used for purging operations and stand-by protection in large gas-producing plant. Capacity 15,000 cfh.



Installation of three R-C Inert Gas Generators similar to this one helped one large plant save $6,000 per month insurance premiums, as well as substantially reduce danger of production losses caused by explosion or fires. Capacity of each unit, 6,000 cfh.

ROOTS-CONNERSVILLE
BLOWER BUILDERS SINCE 1848
ONE OF THE DRESSER INDUSTRIES

Knot It! Kink It! ...IT WON'T HURT A Tuffy® SLING!

Patent No. 2,454,417

Get your FREE Tuffy 3-ft. sample sling and see for yourself how Tuffy's patented braided wire fabric makes an extra flexible sling. Tie it in knots, kink it, then see how easily it is straightened without damaging it in any way.

The reason is Tuffy's unique construction. (See enlarged photograph). Scores of wires are stranded into 9 parts, then machine woven into a wire fabric that has unusual flexibility and strength. Even cutting one of the 9 parts will not cause stranding.

11 Types of Tuffy Slings Available

There's a Tuffy Sling for *your* needs. If not, Union Wire Rope engineers will help work out special slings. Each one is proof-tested to twice its safe working load and the safe working load is stamped on metal tag attached to each sling. If you have your own rigging loft, Tuffy fabric is available by the reel.

MAIL COUPON FOR YOUR FREE SLING

See for yourself that all the things we claim for Tuffy Slings are true. A free 3-foot sample is yours for the asking. Just mail the coupon and your Union fieldman will deliver yours to you.

UNION WIRE ROPE CORPORATION
Specialists in Wire Rope, Braided Wire Fabric and High Carbon Wire
2234 Manchester Ave. Kansas City, Mo.

Gentlemen: Please have my Union Wire Rope Fieldman deliver my free Tuffy sling sample.

NAME_____

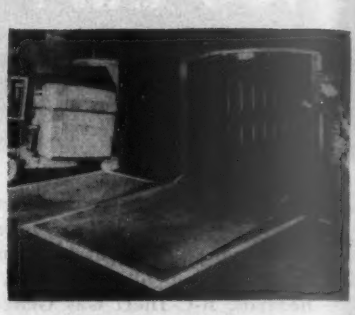
FIRM NAME _____

ADDRESS_____

CITY_____ ZONE____ STATE_____

MATERIALS HANDLING EQUIPMENT

Begins on page 136



Loading Dock Ramp

A Leva-Dock ramp will handle loads up to 10,000 lb. It takes your fork trucks into trucks or trailer vans for direct loading and unloading.

The ramp hinges to the loading dock, hydraulic jack tilts it above or below the level of the dock. Movement is controlled by an electric power unit that will handle up to nine ramps.

The platform automatically adjusts to stay level with the truck during loading. Retractable supporting arms and a throw-over bridge connect ramp to the truck. You can move the throw-over bridge to either side to position ramp on the truck bed.

Rotary Lift Co., Box 2177-A, Memphis 2, Tenn.

■

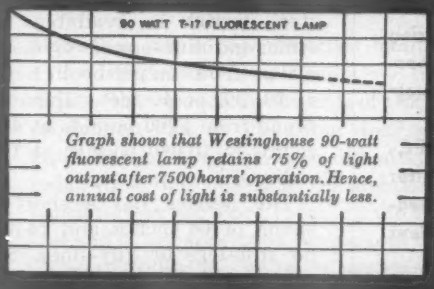
STANDARD STEEL CHUTES for handling bulk and packaged materials are formed in one piece from heavy-gage steel. Sage Equipment Co., 30 Essex St., Buffalo 13, N. Y., makes them in 6-, 8-, 10-, and 12-ft. lengths. Widths range from 6 to 36 inches, in 6-in. increments. You use a tripod stand to adjust the down end.

A BELT TRAINING CARRIER is a set of rolls that automatically keeps your conveyor belt aligned. As soon as the belt starts to shift, the training carrier tilts slightly to return belt to center. You need one only every 50 feet or so to do the job, says Stephens-Adamson Mfg. Co., Aurora, Ill.

Turn the page

NOW—LIGHT OUTPUT OF WESTINGHOUSE 90-WATT FLUORESCENT LAMP TOPS ALL OTHERS IN ITS CLASS

New Improvements Boost Light Output Throughout 7500 Hours Of Operation



Graph shows that Westinghouse 90-watt fluorescent lamp retains 75% of light output after 7500 hours' operation. Hence, annual cost of light is substantially less.

The improved *light maintenance* of this exclusive Westinghouse Krypton-Argon 90-watt T-17 fluorescent lamp means that even after 7500 hours of operation it will continue to produce the highest lumen output of any lamp in its class. This gain in light efficiency makes the lamp still more economical for industrial and commercial use.

The improved Westinghouse lamp provides a higher average foot-candle level, and reduces the annual cost of light. It makes a group lamp replacement program more practical and economical. What's more, the Westinghouse 90-watt lamp is designed to operate in any standard 85- or 100-watt T-17 lighting equipment.

For more detailed information on how this new lamp can fit into your present or planned lighting installations, write to Lamp Division, Westinghouse Electric Corporation, Bloomfield, N. J.

YOU CAN BE SURE... IF IT'S Westinghouse

AEROTURN
DUST COLLECTORS

FIRST! with

SELF-ADJUSTING
BLOW RINGS

PATENTED

A MAJOR ADVANCE IN DUST COLLECTOR DESIGN

AEROTURN engineers have developed blow rings for the Aeroturn bag-type collector which are both self-adjusting and self-aligning.

EACH FELT FILTER BAG in the Aeroturn collector is circled by a blow ring which travels up and down the bag, flexing it slightly and directing a hi-pressure reverse-air-jet into the bag from all sides to dislodge the accumulated dust from the filtering process.

THE SELF-ADJUSTING BLOW RING, exclusive with Aeroturn, is made in two half-sections which automatically conform to the bag's diameter. The entire blow ring assembly is so mounted that it floats laterally to compensate for any vertical misalignment of the felt filtering bag. These features eliminate unnecessary chafing or wear in concentrated areas along the filter bag.

The AEROTURN COLLECTOR is a compact efficient dust filter requiring only ⅓ to ½ the area needed by other dust filters of equivalent capacity.

Bulletin No. 501 on Aeroturn Collectors will be sent on request.

Licensed under Hersey patent rights other patents pending.

TURNER & HAWS ENGINEERING CO., INC.
100 SIMBROCO ST. BOSTON 32, MASS.

MATERIALS HANDLING EQUIPMENT

Begins on page 136

Deflector Speeds Truck Loading

A new roller deflector speeds the shunting of materials from one conveyor line to another. When used as above, the Wilkie deflector makes truck and car loading more nearly automatic.

The deflector in this case has been attached to the platform end of a telescoping portable conveyor. It picks off cartons from the permanent belt conveyor, and guides them at right angles into the truck bed. Both right- and left-hand deflectors are available.

Wilkie Co., 5520 Arch St., Philadelphia 39.

■

Full-Revolving Yard Derrick

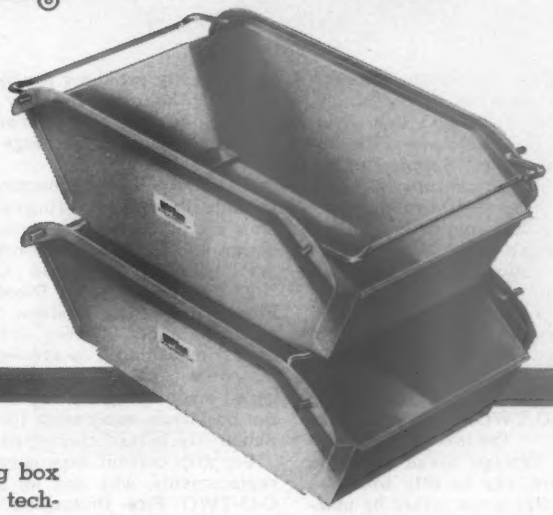
A full-revolving stationary steel derrick is available with either gasoline-engine or electric drive. You can get boom lengths of 20, 30, or 40 feet. Capacities range from 2000 pounds at 40-ft. radius to 10,000 pounds at 10-ft. radius.

The derrick has a short tail swing of 66 inches and requires no stiff-legs or guy-lines. So it can be set up in a minimum of space in congested areas.

The complete rotating structure (boom, boom supports, and hoist) is centered on a cast steel turntable. Four double-tapered, antifriction bearing rollers carry the load.

Maker recommends the derrick

AT LAST-
Scientific Design applied to the "TOTE BOX"



More than just a new materials handling box—the NesTier is a new system—a new technique—that speeds up the flow of work on any production line. It offers four definite advantages over all older methods of handling small parts: (1) saving of space; (2) greatest ease of handling—in the stock room, on the assembly line and in transportation throughout the plant; (3) adaptability to conveyor systems; (4) visibility and easy accessibility of parts.

NesTier materials handling boxes nest when empty—tier when filled. Tiered, parts in all boxes are visible and accessible. NesTiers are ruggedly constructed of heavy gauge steel and are available in two standard sizes: No. 220—16 ga., 22⅜" long, weight 15 lbs.; No. 175—18 ga., 18¼" long, weight 6 lbs.

Write for full details on NesTiers, racks, trucks, monorail carriers and dollies.

Our service includes complete engineering advice on systematizing the handling of small parts in your plant. Your inquiries are invited.

NESTIER
IT NESTS...IT TIERS

Metal Specialties Division, The Chas. Wm. Doepke Mfg. Co., Inc., Rossmoyne, Ohio

Plant-Wide Fire Protection

from a single LOW PRESSURE CARBON DIOXIDE storage tank

Now, your larger size fire hazards can be protected more efficiently at less cost, thanks to C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing Systems. Simple piping, running from one centrally located storage tank, instantly transports clean, non-damaging, non-conducting carbon dioxide anywhere in the plant area . . . to flammable liquids, electrical equipment, storage spaces, manufacturing processes and record vaults. Fire at any protected location is extinguished in seconds with an absolute minimum of expense and interruption.

Flexibility is the keynote of these new type C-O-TWO Fire Extinguishing Systems . . . the low pressure carbon dioxide storage tanks range in capacities from one to fifty tons . . . discharge facilities can either be manual mechanical, manual electric, automatic mechanical, automatic electric or a combination of these . . . especially installed to fit your particular needs. Future plant expansion is easily and economically provided for by initially installing an oversized low pressure carbon dioxide storage tank and adding the supplementary discharge facilities at a later date.

C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing Systems are built with the same superior design and high quality workmanship that have characterized C-O-TWO High Pressure Carbon Dioxide Type Fire Extinguishing Systems for many years. Whether it's fire detecting or fire extinguishing . . . portables or built-in systems . . . C-O-TWO means experienced engineering that assures you of the best type equipment for the particular fire hazard concerned.

So, with current expensive delayed replacements, why not let an expert C-O-TWO Fire Protection Engineer help you now in planning fully approved fire protection facilities for your various properties. Complete free information and descriptive literature is yours for the asking. Get the facts today!

C-O-TWO

C-O-TWO FIRE EQUIPMENT COMPANY

NEWARK 1 • NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada

Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

for use at rail or truck loading stations, and for general utility work around industrial plants.

Clyde Iron Works, Inc., Duluth 1, Minn.

■

Portable Power Lift

The Langley Powrlift will stack loads to a height of 60 inches. There are two stock sizes—500- and 1000-lb. capacity. Hoist is powered by a motor that runs off a battery or 110-volt, 60-cycle line. The unit is recommended for lifting and double-decking drums, barrels, heavy dies, and shop equipment.

Lift platform measures 24x24 inches. Lowered height is 5 inches. The Powrlift is mounted on steel casters so that it can be moved where needed in the plant.

The Langley people say the Powrlift is simple to handle. You can plug it into the nearest socket, then turn the handle up or down to raise or lower the platform.

Electric-powered model has elevator-type brakes, chain lift. Battery model has a 6-volt electric-hydraulic drive.

Langley Mfg. Co., 920 Cambridge St., Cambridge, Mass.

■

Elevator-Type Portable Lift

The Uplifter is either a 500- or 1000-lb. platform lift. It all depends on how you adjust the lift cable and sheaves.

This elevator-type truck is mounted on steel casters. It has a 41-in. turning radius, a 77-in. over-all height. Maximum lift is 62 inches. Platform measures 24x24 inches. Truck itself weighs 415 pounds. Force needed to crank a 1000-lb. load is 17 pounds.

Revolvator Co., 8706 Tonnele Ave., North Bergen, N. J.

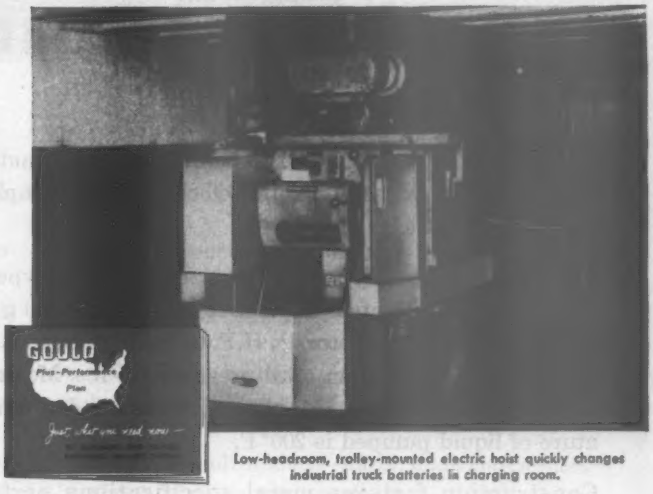
Turn the page

. . . SHOWS YOU WAYS TO HANDLE

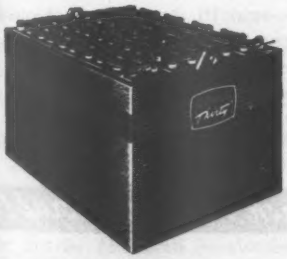
BATTERIES IN YOUR PLANT

Proper planning of the battery charging room is vital to greatest battery efficiency and the maintenance of high volume production at lowest cost. That's why the GOULD PLUS-PERFORMANCE PLAN contains extensive information on the charging and handling of batteries. This material, together with manuals, articles, specifications, bulletins, record cards, charts and graphs covering every phase of battery care, is yours for the asking.

With the GOULD PLUS-PERFORMANCE PLAN, you have at your fingertips a complete file of technical information on how to select, charge and handle, maintain and determine the condition of your batteries. Use it and battery service can be increased as much as 50%. Send today for the booklet shown at the right.



Low-headroom, trolley-mounted electric hoist quickly changes industrial truck batteries in charging room.



Gould "Thirty" with "Z" Plates—
America's Finest
Industrial Truck Battery

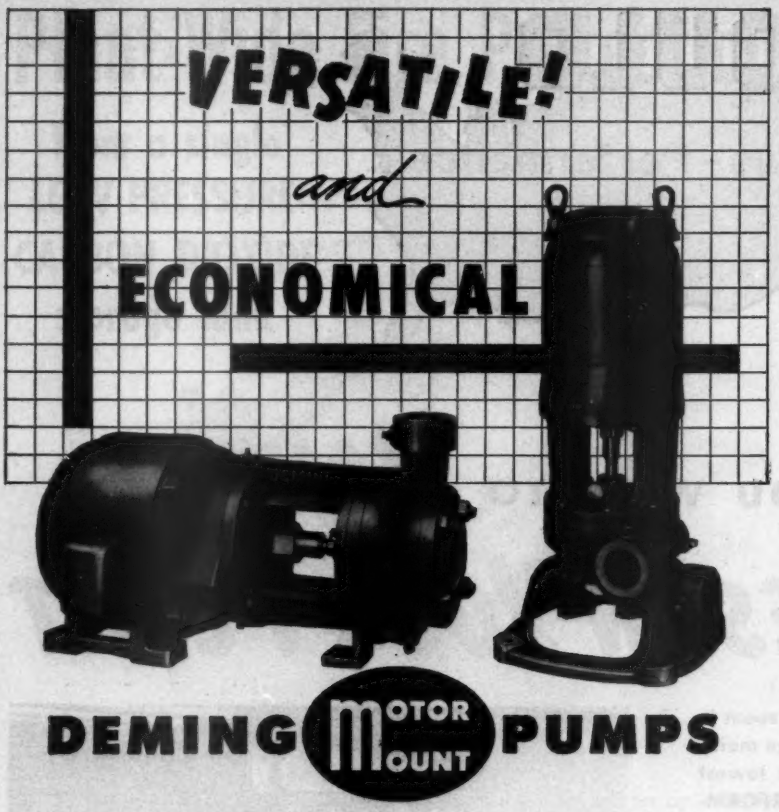
TRAVELLING HOISTS SPEED BATTERY CHANGES, INCREASE EFFICIENCY, CUT ACCIDENTS

A well planned centralized or decentralized battery charging system with cranes, hoists, battery racks, rollers, etc., located to expedite handling operations is essential to maximum battery service and plant operating efficiency. The illustration above shows such an installation in a Connecticut steel plant. It is unique in that it was fitted into a small, low alcove 15 feet wide, 25 feet long and only 8 feet high. In this space are seven charging units, two transformers, two spare batteries, a rack for simultaneously charging seven 15-cell batteries, space for charging four 6-cell batteries and equipment for lifting, watering and testing. To save headroom, a special pickup attachment is secured directly to the hoist pulley housing. This layout eliminates manual handling operations, simplifies battery maintenance and results in greatly added battery life. Details and other handling suggestions are contained in GOULD PLUS-PERFORMANCE PLAN material.

GOULD **STORAGE BATTERIES**

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

Always Use Gould-National Automobile and Truck Batteries

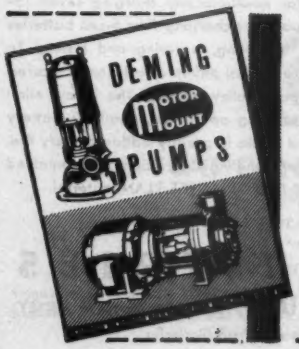


DEMING MOTOR-MOUNT Pumps are compact, dependable units combining high efficiency with simplicity at minimum cost.

The line includes Type "H" (Horizontal) and Type "V" (Vertical) as illustrated. Capacities range up to 200 g.p.m. Heads up to 165 ft. Motors ¼ H.P. to 7½ H.P. Speeds 1750 to 3500 r.p.m. Maximum total pressure 125 lbs. Maximum suction pressure 50 lbs. Maximum recommended temperature of liquid pumped is 200° F.

Construction features, metal specifications, performance charts and other data are covered graphically in BULLETIN NO. 4350.

To save your time, use the convenient form below.



THE DEMING COMPANY

530 Broadway, Salem, Ohio

Please mail free copy of your BULLETIN NO. 4350 which describes Deming MOTOR-MOUNT PUMPS.

Name.....

Company.....

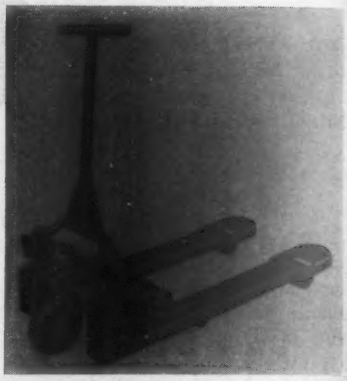
Address.....

.....

.....

MATERIALS HANDLING EQUIPMENT

Begins on page 136



Single-Stroke Pallet Lift Truck

This is Pal-It, a single-stroke pallet lift truck. It's an easily maintained lift truck for the lighter plant loads. Capacity is 2000 pounds.

You raise the load with one stroke of the handle, lower it through a trip-lever release. Total lift is 1¾ inches. Pal-It has roller bearing wheels, comes in standard pallet sizes.

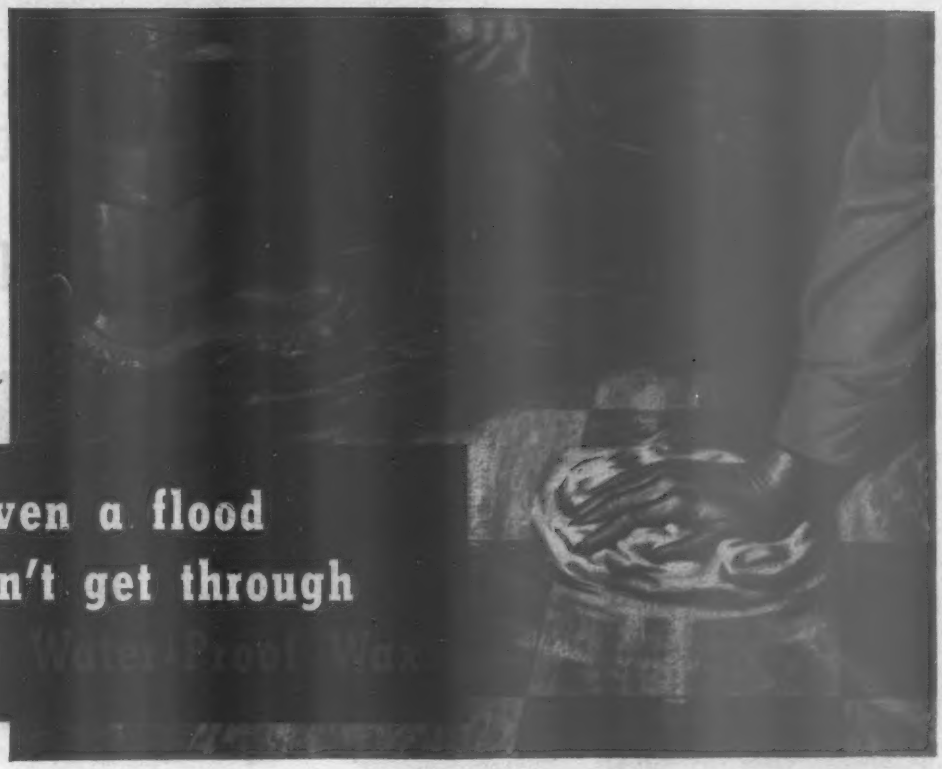
Plant Equipment Co., 2509-11 Fifth Ave., Rock Island, Ill.

A 90-DEG. POWER CURVE takes cartons around corners in an orderly, sure-fire manner, says the Alvey-Ferguson Co., 75 Disney St., Cincinnati 9. Tapered rollers control packages as they take the turn, eliminate skewing or jamming. A simple V-belt drive gives smooth operation at low maintenance cost. The drive requires no oiling, and can readily be removed without dismantling the conveyor.

Turn the page

Cash in your Scrap!

When you earmark **obsolete equipment for the scrap drive, you are helping to improve your company's profit position, and also helping to keep the mills turning out the steel needed for national defense.**



Even a flood couldn't get through

Cetronia Fire Station floor still shines after 24 hours under water, mud and silt!

What happens to a floor buried under mud, silt and water?

The volunteer firemen of Cetronia Fire Co. No. 1, near Allentown, Pa., can tell you. They had just waxed the floor of their basement recreation room with Holcomb Water-Proof Wax when nearby Cedar Creek flooded the place.

It was 24 hours later before they could pump out the water, shovel out the muck and wash down the floor. Said Mr. Frank L. Anthony, member of the board of governors, "After we finally dry-mopped the floor it was still glossy. No additional wax was needed!"

Even under punishment like this, Holcomb Water-Proof Wax *stays* waterproof . . . stands up better . . . costs less to use.

Test it on your own floors. See how this wax keeps its self-polishing brilliance. See how it patches perfectly without cloudy "joints"; doesn't chip, wash off or discolor.

Every Holcomb product—waxes, soaps and cleaners, brushes and equipment—is designed to reduce your time cost, to do the job faster. It will pay you to standardize on Holcomb—your one source, your dependable source, for scientific cleaning materials.

RESEARCH LABORATORY AND FACTORY • *1601 Barth Avenue, Indianapolis 7, Indiana* • *Branches: New York 18, Los Angeles 21*

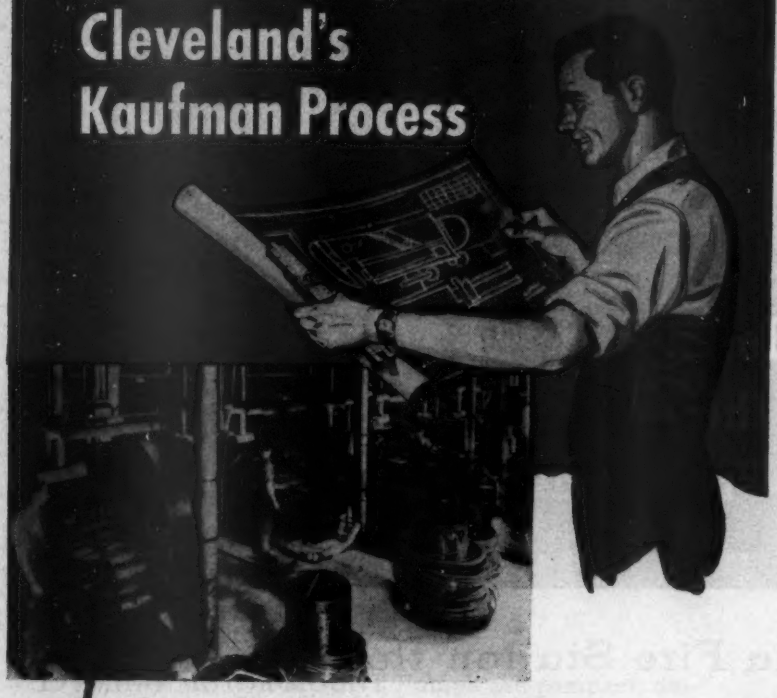
Call a Cleaning Engineer—your nearby Holcomb Serviceman. He will come into your plant, make a complete cleaning survey, give you the best recommendations for walls, floors, ceilings and machinery. Write for name of the Holcomb Serviceman in your community.

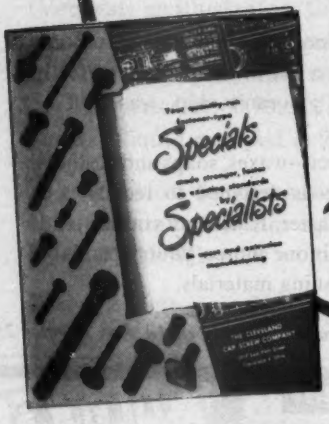
J. I. HOLCOMB

MANUFACTURING COMPANY

Scientific cleaning materials

Simplify your special parts* production problem with Cleveland's Kaufman Process





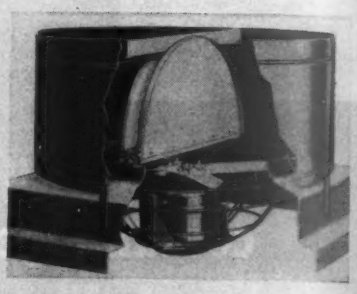
Have your unusual *fastener-type parts made to your specifications by extrusion forging. Cleveland's Kaufman Process guarantees a tougher product, accurate in every dimensional detail—usually ready for use without machining. This method is faster, therefore more economical in most cases. The steel and heat treatment you specify are followed to "the letter".

Relieve your shop of this production problem. Have your quantity-run fastener-type specials made better and faster at Cleveland. Write for folder "Specials by Specialists."

THE CLEVELAND CAP SCREW COMPANY
2917 East 79th Street, Cleveland 4, Ohio

CLEVELAND *Top Quality* FASTENERS

AIR CONDITIONING



Straight-Through Roof Ventilator

Latest Swartwout powered roof ventilator is this Whirlout. Maker says it has simple design, low over-all height.

The Whirlout is weatherproof at all times. It is open only when the propeller fan is operating. The force of the air stream holds open the two hinged dampers whenever plant air is exhausted to the outside.

The Swartwout Co., 18511 Euclid Ave., Cleveland 12.

■

Gas Unit Heaters for Duct Installation

Pittsburgh Duct Furnaces are designed for air conditioning installations where ductwork is already in place. These gas unit heaters have no blowers. They are designed to work on an air supply from a central station.

Pittsburgh heaters come in sizes ranging from 12,000 to 200,000 Btu. per hour. You get them completely assembled with controls and built-in draft diverter. Units are A.G.A. approved at 2 inches water column pressure .

Automatic Gas Equipment Co., 472 Brushton Ave., Pittsburgh 21.

Turn the page

How to "Corral" Wild Horsepower

Gasoline is, of course, a tremendous source of horsepower—but this energy is first controlled through the mixing of fuel and air in the carburetor of an engine.

In the laboratories of the Engineering Staff at the General Motors Technical Center where automotive carburetors are tested, this control is made even more complete by keeping temperature and humidity so constant that the volatility of the gasoline is not affected. Only in this way can standardized carburetor flow tests be made possible.

Uniform temperature and humidity are maintained—in this particular laboratory—by means of a remote installation of Frigidaire Air Conditioning equipment. But whatever your own plant's air conditioning needs are, you'll find that Frigidaire has the equipment to meet your needs quickly and inexpensively.

Small workrooms and offices can be air conditioned with Frigidaire Room Conditioners. For large areas, Frigidaire Self-Contained Air Conditioners can be installed quickly with no interruptions to work schedules. They require little or no duct work and no major alterations. Frigidaire Central Systems are also available for a wide range of applications.

For details, call your nearby Frigidaire Dealer, Distributor or Factory Branch. And ask, too, for Frigidaire's free Refrigeration Security Analysis. Look in the Yellow Pages of your phone book. Or write to the Frigidaire Division of General Motors, Dayton 1, Ohio. In Canada, Leaside (Toronto 17), Ontario.

Frigidaire reserves the right to change specifications, or discontinue models, without notice.

Frigidaire Air Conditioning keeps temperature and humidity constant in laboratory where carburetors are tested. 100% fresh air eliminates possibility of exploding gasoline vapors.

FRIGIDAIRE

Over 400 Refrigeration and Air Conditioning Products for Offices Laboratories • Processing • Precision Assembly • Storage Areas Plant Lunchrooms • Medical Departments • Water and Liquid Cooling

Pharmaceuticals and vitamin products are safeguarded in this Frigidaire-equipped storage room. These products can lose potency rapidly at temperatures above 50°. With refrigeration, manufacturers can maintain larger inventories, and doctors and druggists are assured of full-strength products.

Employees feel better and work better, when they get nourishing meals from a Frigidaire-equipped plant cafeteria. Frigidaire products include reach-in refrigerators, low-temperature cabinets, compressors, cooling units, beverage coolers, ice makers, water coolers and air conditioning equipment.

FREE! For helpful information about Frigidaire products and their applications, send for interesting new booklet that tells about a few of the many opportunities in Frigidaire refrigeration and air conditioning equipment for the manufacturing and processing industries. Use coupon below.

Frigidaire Division
General Motors Corporation
1512 Amelia Street,
Dayton 1, Ohio

Please send me a copy of *Frigidaire Refrigeration and Air Conditioning Equipment for the Manufacturing and Processing Industries.*

Name _____

Firm Name _____

Street _____

City _____ *Zone* ____ *State* _____

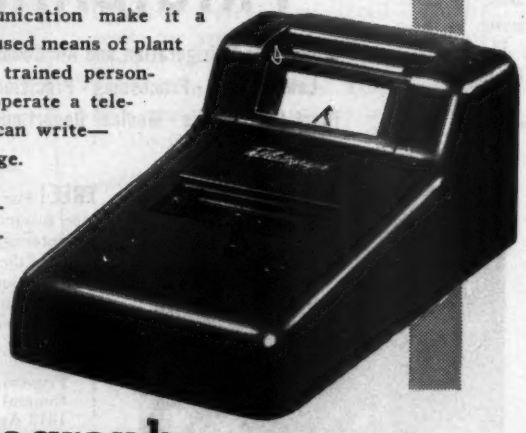
"Up" Your Plant Capacity With TelAutograph Telescribers

Plant capacity at peak? Too frequently quick answers to upping capacity are: "More Help" and "More Space." In most instances, *improved operating technique is the real answer* . . . and the economical one.

Improved Materials Handling, Quality Control and Production Control through better operating techniques save time, reduce expense and increase output. This *is* increasing plant capacity.

Workable intra-plant communication is basic in bringing about these savings.

TelAutograph Telescriber Systems have provided factories with handwritten communication control for decades. Simplicity, accuracy and dependability of telescriber communication make it a highly valued, widely used means of plant integration. Specially trained personnel is not needed to operate a telescriber. Anyone who can write—can telescribe a message.



For specific information on how TelAutograph telescribers can be of value to your operation write to Dept. B-12.

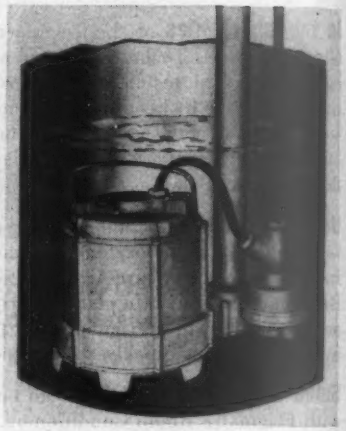
TelAutograph CORPORATION

16 West 61st Street, New York 23, N. Y.

Telescriber TelAutograph Service

"Handwritten Messages Deliver Themselves . . . While You Write"

AUXILIARY EQUIPMENT



Fully Submersible Utility Pump

Here's a utility pump that you can completely submerge in water or other liquids. It's basically a sump pump. But you can use it for draining tanks and vats, or for bailing out flooded areas.

Pumping is started automatically by rising liquid. The pressure-actuated switch has no moving parts in contact with the water. So it cannot be fouled by silt or debris. Low turn-off point permits the unit to pump to within 5/8 inch of the bottom.

The unit weighs only 50 pounds. It can be moved and placed in operation very quickly. Completely-submersible feature permits use without special mounting brackets.

The 1/3-hp. motor is hermetically sealed in oil. It requires no oiling or greasing. Pump is all-bronze construction. Capacity is 3300 gph. Cord switch permits manual as well as automatic starting. Price: $95.50.

Kenco, Inc., 1125 N. Ridge Rd., Lorain, Ohio.

Turn to page 156

"Whatever Your Conveyor Belting Problem . . . *Thermoid Has The Answer*"

Perhaps your problem is handling packages on an incline of 25—even 35—degrees. You'll find the solution in Thermoid "Ruff-Top" Conveyor Belting—with its thousands of small, rough, irregular-shaped points of soft rubber that take a firm grip on the lightest packages or cartons.

But whatever the job—whatever the nature of materials to be handled—heavy or light, soft or abrasive, hot or cold, wet or dry, uniform or non-uniform in size—consult your Thermoid distributor. He can recommend the right type of Thermoid Belt to do the job at the lowest cost per ton of material moved.

Thermoid's extra margin of endurance means fewer delays due to belt breakage or premature wear.

Here's The Book That Will Answer Many Of Your Questions

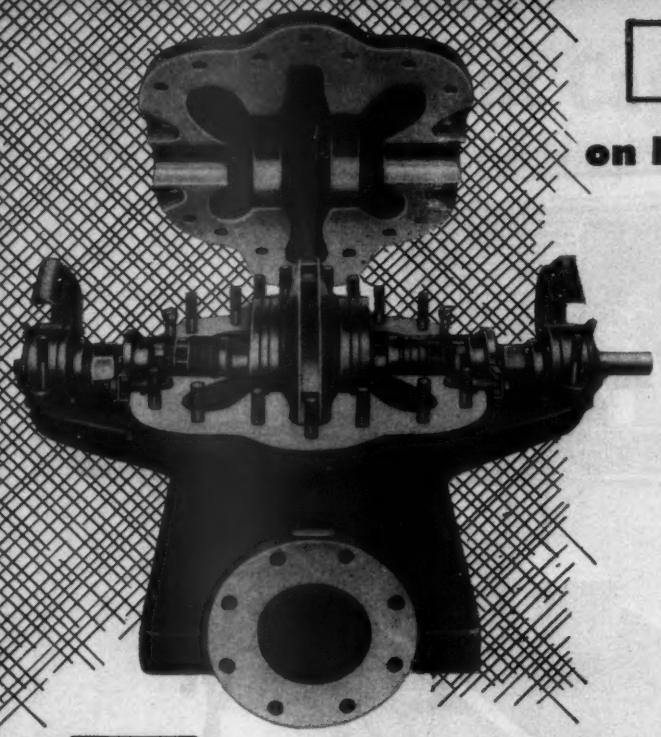
Drop us a line for your free copy of Book No. 3679. It is a handy reference guide, concise and complete. 16 pages of valuable charts, tables and graphs tell how to select the right conveyor or elevator belt for the materials to be handled . . . how to determine capacities, speeds, weights and number of plies.

Thermoid

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



the *Inside* Story

on Better Pumping Performance

Look at the "insides" of a Fairbanks-Morse Single-Stage Split-Case Centrifugal Pump.

Note how easy it is to inspect or service all working parts . . . the ease with which the entire rotating element can be removed without disturbing driver or pipe connections. It means lower maintenance costs . . . less lost operating time.

Note the sturdy construction and exceptional strength provided by the arched casing and solid pump base . . . the one-piece impeller that reduces wear and maintains efficiency . . . the integrally cast bearing brackets that maintain accurate, permanent alignment of shaft and impeller.

These are but a few of the many performance-making features you'll find that mean more years of efficient, economical service.

FAIRBANKS-

A NAME WORTH R

. . . and for another "inside" story, look over the amazing new Fairbanks-Morse "Bladeless" Impeller Pump. Here's the ideal pump where your requirements involve the handling of solids. As indicated in the phantom view of the impeller, there are no "blades" to catch or damage pumped material. Food products, for example, can be pumped without damage.

For process handling applications . . . food, chemicals, in fact any application where products are transported in a liquid, the Fairbanks-Morse "Bladeless" Impeller Solids-Handling Pump will pay dividends in lower costs . . . more efficient operation.

don't "Figure" it . . .

READ it to speed weighing . . . stop errors

With Fairbanks-Morse Direct Reading Cabinet Dial Scales, you read the *correct* weight right at the point of the indicator from zero to full capacity *regardless of the number of drop weights used!* This exclusive Fairbanks-Morse development speeds and simplifies weighing . . . minimizes the chance for costly human error.

No mental calculations are required. Drop weights are applied by an easy-acting hand crank. And as the weights are applied, a revolving disc automatically changes the figures on the chart.

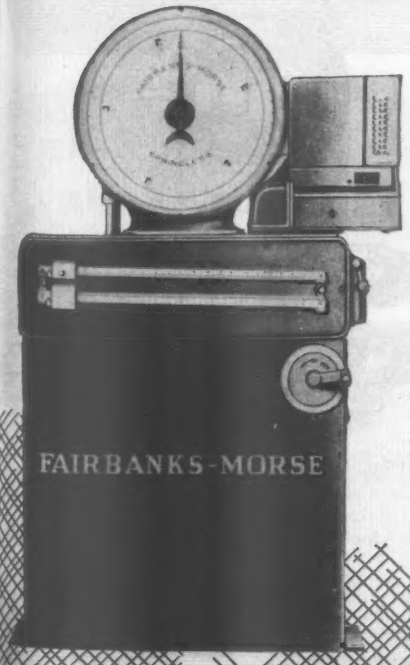
You'll find Fairbanks-Morse Direct Reading Cabinet Dials provide the "easy way to weigh" for sustained accuracy and fast operation.

Here's how the Direct Reading Dial eliminates mental calculations. Illustrated above is a small segment of a dial chart. Without drop weight, the figure in the chart window reads 700 pounds. If one drop weight is applied, the figure in the chart window automatically changes to read 1700 pounds.

S-MORSE

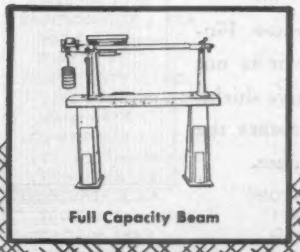
H REMEMBERING

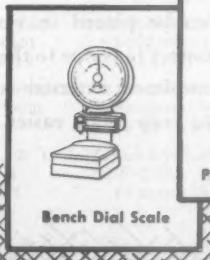
See Next Page for
FAIRBANKS-MORSE
Sales Centers



for the ultimate in automatic weighing,

Fairbanks-Morse Direct Reading Cabinet Dials can be equipped with Printomatic Weighers to provide automatic recording of weights on a ticket, roll tape or both. Printomatic recording eliminates the possibility of human error and assures a permanent, accurate record of all weighing operations. In addition to weights, other features such as identifying symbols, time, date, etc., can also be recorded simultaneously. It's the ultimate in fast, accurate weighing.


Full Capacity Beam


Bench Dial Scale

Portable Dial Scale

MOST Advantages for MOST Motor Applications

STANDARD DRIP-PROOF MOTORS FOR YOUR PROTECTION

Practically every motor needs protection—from flying chips, falling particles, dripping liquids, and the like. Also, by far the majority of motors used are of the polyphase, squirrel cage type.

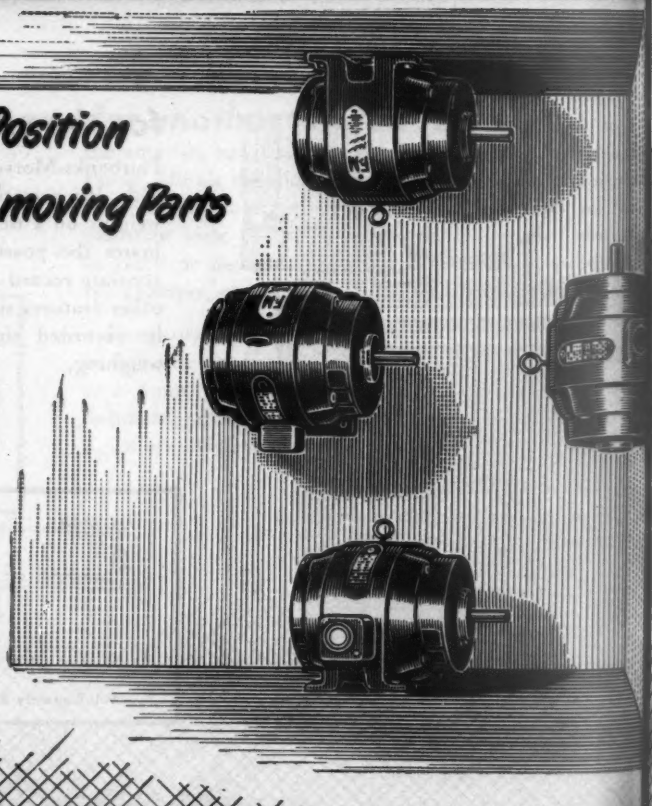
These requirements are met to a unique degree by this series of Fairbanks-Morse motors—with built-in protection and superior electrical and mechanical design that account for their popularity throughout industry.

Whether your motor application problems involve driving pumps, machine tools, compressors, elevators, fans—or any of an infinite number of other applications—Fairbanks-Morse Standard Drip-proof Motors deserve your early investigation. Call your nearest Fairbanks-Morse Sales and Service center.

FAIRBANKS

A NAME WORTH

PROTECTION.. *in any Position*
SAFETY.. *no Exposed moving Parts*



Mount these motors anywhere—even on the ceiling or walls. Bearing arms have four bolts spaced 90° apart, enabling the bearing brackets to be adjusted to assure maximum protection. Motor can be mounted vertically without any changes in bearing construction.

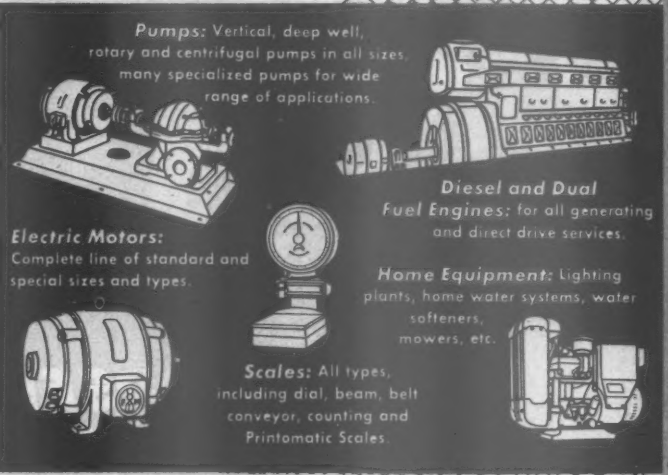
There is complete safety for the operator. Fingers can even be placed in vents, for it is not possible to contact fans due to the protective shield. Smooth, streamlined external contour makes the motor easy to keep clean, easier to maintain.

for MOST Assistance when you need it...

CALL YOUR FAIRBANKS-MORSE SALES CENTER

You need all the help you can get these days in procuring new equipment—in obtaining parts and repair service to keep your older equipment running at peak output. You'll find your Fairbanks-Morse Sales Center geared to help you in all these important efforts. It is staffed with factory-trained sales and service personnel, ready to give complete engineering assistance in product maintenance and application.

Unbiased advice is assured, for the Fairbanks-Morse lines of motors, pumps, scales and diesel engines are long and complete: helpful assistance is assured too, for you know you will be dealing with experts in the product in which you are interested.


Pumps: Vertical, deep well, rotary and centrifugal pumps in all sizes, many specialized pumps for wide range of applications.
Diesel and Dual Fuel Engines: for all generating and direct drive services.
Electric Motors: Complete line of standard and special sizes and types.
Home Equipment: Lighting plants, home water systems, water softeners, mowers, etc.
Scales: All types, including dial, beam, belt conveyor, counting and Printomatic Scales.

MORSE

REMEMBERING

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Export Division:
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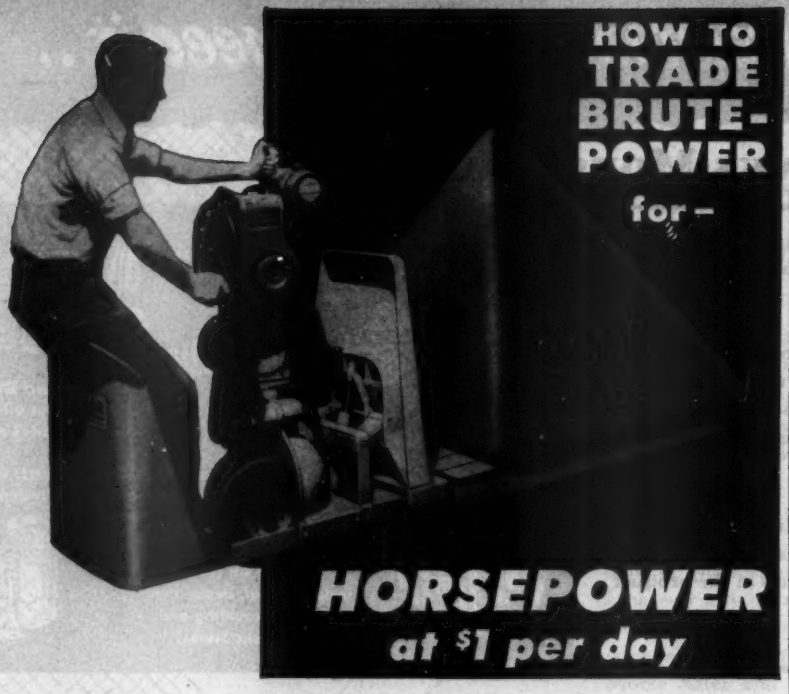
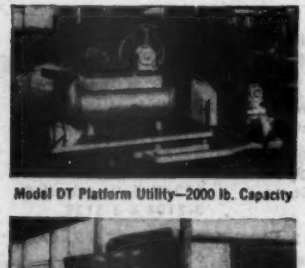


Here's how you can install modern lift-truck handling methods in your plant—and your fuel cost may be less than $1 per 2-shift day. The versatile Truck-Man's rugged gasoline power, hydraulic lift and maneuverability fit it into plants and warehouses of all types and sizes. Here's how Truck-Man can save your money and manpower:

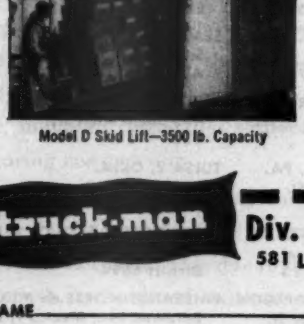
IF YOU'RE SMALL — Truck-Man Skid Lift, Pallet Toter or Platform Utility move loads now handled by two or three men with "push-pull" trucks or hand-led powered "jacks," limited to the pace of the operator.

IF YOU'RE GROWING — The Truck-Man Pallet Toter is economical for picking up distant palletized loads and laying 'em down for your heavier, costlier "stacker." Use Model D if you work with skids.

IF YOU'RE BIG — Plants covering acres use fleets of Truck-Man Pallet Toters as inter-plant "feeders"— increase the efficiency of their big fuel-and-power-consuming stackers by restricting travel to small areas. The Skid Lift easily handles 3500 lb. skid and bin loads, loading directly on trucks and cars.



Model DT Platform Utility—2000 lb. Capacity



Model D Skid Lift—3500 lb. Capacity

TRUCK-MAN GIVES YOU—

• Low cost, easy maintenance, a minimum of fuel and labor • Maneuverability in crowded aisles, 360° steering, 27" width • Simple, sure handling with driver always facing load and his "spot" • Pneumatic-tired drive wheels for fragile loads, wooden floors, reduced driver fatigue • Dash pot throttle controls for soft starting; two speeds forward and reverse; speeds from a creep to 8 mph • Efficient load to weight ratio of almost 4 to 1, easy on elevators, ramps, car and truck floors • Rugged design — built for 'round-the-clock, man-saving work!

NEW POWER
NEW STEERING
NEW TRANSMISSION

Send Coupon for Catalog

truck-man **Div. of The KNICKERBOCKER CO.**
581 LIBERTY ST. • JACKSON, MICH.

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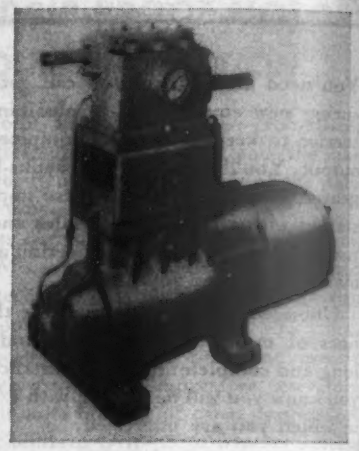
NEW AUXILIARY EQUIPMENT

Begins on page 150



High-Pressure Triplex Pump

The Kobe people say you can use this packaged hydraulic generator in all types of hydraulic power systems. You can get them in 15-, 30-, and 50-hp. sizes, with pressure ratings up to 5000 psi., displacements up to 60 gpm. Pumps with heads of 10,000 and 20,000 psi. are available on special order.

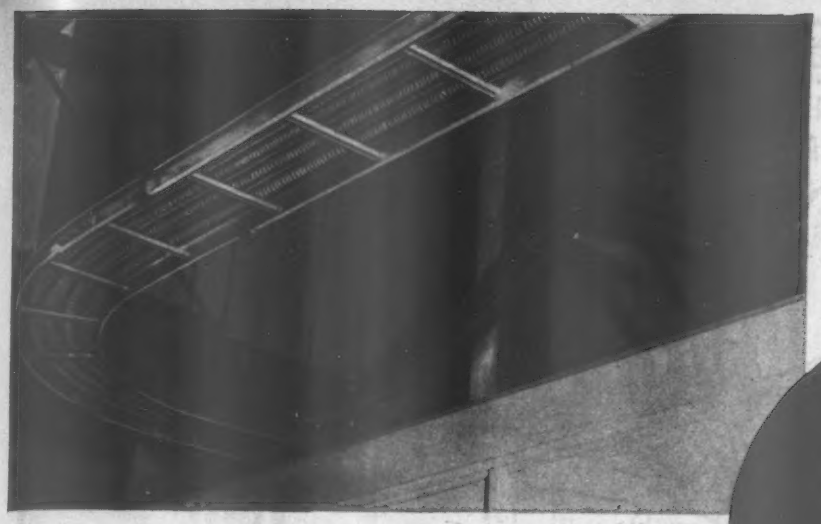
The Kobe triplex pump comes with integral gears in a variety of ratios. You can interchange plungers and liners to get a wide range of pressure-volume ratings for each unit. Spring-loaded balls and hardened-and-ground seats serve as inlet and outlet valves. Other built-in features include pressure lubrication, pressure gage, relief valve, and scavenger pump. The Kobe triplex is completely enclosed. You can get it with integral, drip-proof Sterling electric motor drive.

Kobe Inc., Div. of Dresser Equipment Co., Huntington Park, Calif.

Turn the page

Cash in your Scrap!

An unused rail siding can help make steel for essential defense production.



Standard three-conductor, 600 v, interlocked armor cable. Also available for 110 v to 15,000 v circuits.

How can you cut power circuit installation time?

For almost twenty years the flexibility of G-E varnished-cambric interlocked armor cable has helped users cut installation time.

THE REASON: G-E interlocked armor cable for plant power circuits was specifically designed for fast installation in even the most difficult places. Its raceway is built in—ready to install. It is so flexible you can readily bend it around pillars, I-beams, and partitions—requires no special installation or time-consuming layout techniques. Because of its light weight, you can string G-E interlocked armor cable over long runs without pull boxes or lay it up on existing beams.

You save, not only time and space, but also initial material costs. G-E interlocked armor cable can even be used over again when plant layouts are changed.

To get complete data, write Section W77-1234, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

You can put your confidence in—

GENERAL ELECTRIC

Everybody wants a

HALLOWELL®

STEEL WORK BENCH!

WHY? Because everybody wants the *best* equipment!

The man who *works at it* wants a HALLOWELL Bench because he likes its *convenience*, its *smooth, durable work surface*, and its *rock-solid "stance"*.

The man who *buys* it wants a HALLOWELL because its *standard-unit* design simplifies plant layout, its *trim, good looks* improve shop appearance, and its *tough, steel construction* eliminates maintenance and replacement for years to come.

Whether you *use* or *buy* work benches, you'll want our Bulletin 701. It gives complete details. Write for your copy today.

SPS STANDARD PRESSED STEEL CO.
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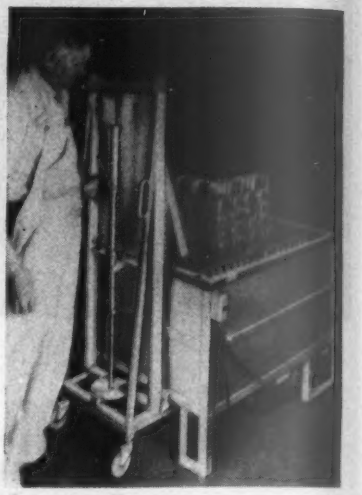
NEW AUXILIARY EQUIPMENT

Begins on page 150



Constant Level Quench Tank

Here's still another piece of equipment to help mechanize quenching operations. It's a constant level, re-circulating-type quench tank. It's designed to receive work from a mechanical loader (see the November FACTORY, page 188). In this way you can take heated parts from the furnace and quench them in one smooth operation.

Maker says his quench tank works equally well with the tong method of handling heat-treated pieces, too.

The Contro-Therm quench tank cools as it circulates the quenching liquids. In addition to the main tank, the unit has a reserve and cooling tank, pump, and motor. As load is lowered into the tank, the displaced coolant overflows into the reserve tank, thus maintaining a constant level in the main tank.

The quench tank is 30 inches wide, 42 inches long, 30 inches deep. Pump is powered by a ¼-hp., 110-volt, single-phase motor. For full details, write for company literature.

A. D. Alpine, Inc., 11837 Teale St., Culver City, Calif.

Turn the page

Photo by Clarisse

Got Traffic Troubles, Mister?

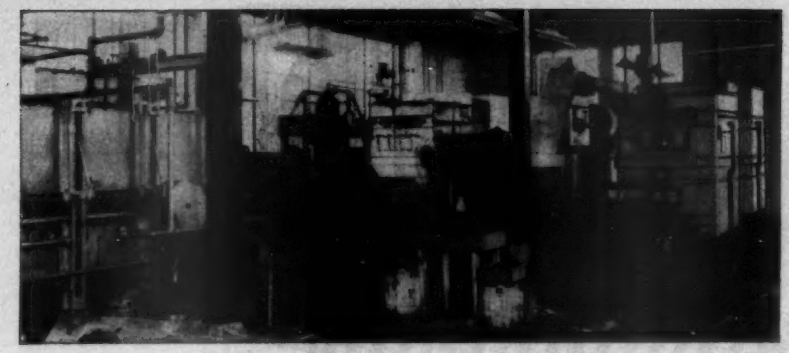
That's tough. But if they have to do with getting a shipment safely somewhere at a certain time . . . and keeping track of it along the way, let's hear about it. That's where dependable delivery and our reliable tracing system meet the situation.

Maybe it's a question of routing or of proper protection for perishables. Whatever it is, it's our job to help you. That's why we have trained traffic men from coast to coast.

We want you to think of Union Pacific as more than just a carrier. Think of us as part of your organization ready with information and suggestions to help you with traffic problems. Call in your nearest U. P. freight representative at any time.

Be Specific – Ship "Union Pacific"

(Offices in 70 cities throughout the U. S. A.)



Niagara Aero Heat Exchanger quickly pulls down the initial peak load of heat in quenching . . . and saves cooling water

Accurate control of quench bath temperatures and quickly effective capacity to handle the initial peak load of heat in quenching prevents production set-backs, increases the output of your heat treating department, prevents oil fires, saves you losses from rejected parts.

Niagara Aero Heat Exchangers give you this control in both furnace and induction hardening methods. They prevent both over-heating and over-cooling of the quench bath. Hundreds of heat treaters know they prevent many troubles, constantly improve quality and increase production.

They quickly pay for themselves by saving cooling water coils and extend your quench capacity without extra water or cooling tower.

Write for Bulletin #120 giving complete information.

NIAGARA BLOWER COMPANY

Over 35 Years' Service in Industrial Air Engineering

Dept. F, 405 Lexington Ave. New York 17, N. Y.

Experienced District Engineers in all Principal Cities

NEW AUXILIARY EQUIPMENT

Begins on page 150

Drill Table With Built-in Coolant System

With the Commander drill table you really get two for one. First of all it's a precision-ground work table with a smooth, square working surface. Second, it's a complete coolant system.

The Commander has a built-in coolant pump and reservoir, and eight semi-rigid, flexible metal nozzles. You can readily position any one or more of the coolant nozzles around the work piece. The flow from each nozzle can be independently controlled from a trickle to full volume.

This portable table can be easily moved from one machine to another and can be squared quickly with the drill spindle, maker says.

Commander Mfg. Co., 4225 W. Kinzie St., Chicago 24.

■

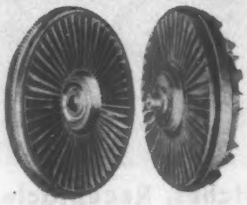
SELF-PRIMING MOTORPUMPS come in handy for pumping under suction lift whenever air or vapor is present in the liquid lines. Units are suited for process and bulk station applications, for sump drainage. Priming is accomplished by recirculation of liquid trapped in the pump casing. Pump sizes range from ¼ to 25 hp., with capacities up to 800 gpm., heads up to 180 feet. Bulletin 7240 tells all. Ingersoll-Rand Co., 11 Broadway, New York 4.

Turn the page

Cash in your Scrap!

Lick "down-time" with YALE 3-POWERED ECONOMY

FLUID DRIVE



Exclusive! Increases clutch life. Gives unfailing, smooth, full power at any speed even on steep ramps. It's the same *fluid* coupling used on fine passenger cars, adapted to heavy industrial use.

HYPOID GEARING

Exclusive! A rugged, over-capacity, yet compact drive. Fully enclosed against dirt and other sources of wear. 4-pinion drop-forged differential with "floating" axles take road shock in stride.

65 HP ENGINE

Exclusive! A cool-running, 6-cylinder industrial engine that gives full floating power at all times. All-weather waterproof ignition. 4-point stress-free, rubber cushioned mounting kills vibration strain and wear on truck.

...aly YALE gas trucks give you these 3 money-saving features that keep trucks on the job

LICK "down time" and you knock out the big cost factor in gas truck operation. You keep your production rolling steadily, at peak levels—while your truck operating costs stay at rock bottom.

YALE, and only YALE, fork-lift gas trucks can give you this big plus—extra strength, extra power, extra precision-geared smoothness throughout the "power line" from engine to differential. Exactly where it's needed most!

While other trucks are "down for repairs" this one *keeps on* moving materials in close quarters, on long hauls, indoors or out, stacking loads nearly 16' high.

That's why YALE 3-powered economy means *more work done every day* plus *more days on the job!* Find out now about putting this economy in your plant.

YALE & TOWNE

YALE is a registered trade mark

MAIL THIS COUPON TODAY!

The Yale & Towne Manufacturing Co. Dept. 312
Philadelphia, Pa.

Please send me detailed information about YALE GAS TRUCKS.

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Company_____

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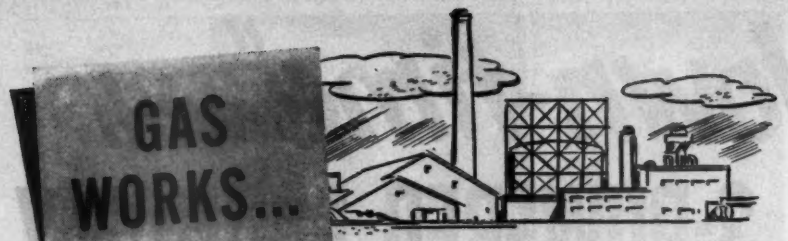
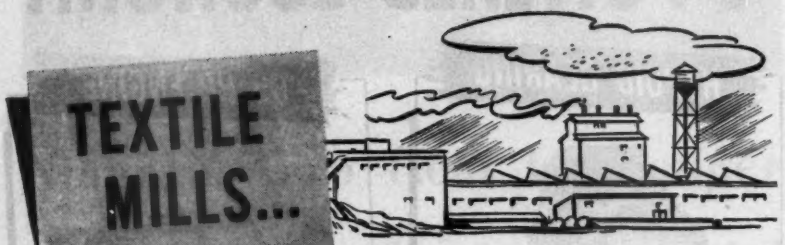
City_____ State_____

In Canada write The Yale & Towne Mfg. Co., St. Catharines, Ontario

YALE GAS AND ELECTRIC INDUSTRIAL TRUCKS • YALE WORKSAVERS • YALE HAND TRUCKS • YALE HAND AND ELECTRIC HOISTS





CHECK CORROSION FROM ACIDS AND ALKALIES LONGER WITH

Gas works . . . constantly exposed to corrosive fumes as well as weather, find the protection of rubber-base paints an important contribution to lower maintenance costs. Similarly, the textile industry uses rubber-base paints extensively because these paints resist acids and alkalies alike—help protect metal and concrete surfaces as well as equipment.

Continuing tests indicate that rubber-base paints will resist common causes of corrosion three to four times longer than ordinary protective coatings. Exceptionally satisfactory service results are obtained in numerous industries where surfaces are attacked by acids, alkalies, and salts.

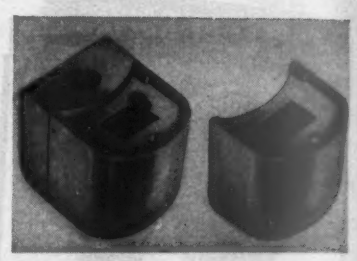
Rubber-base paints dry fast and are easy to apply. They are especially durable on concrete because they resist abrasion and the free alkali in cements. Ask your paint supplier for details or write:

HERCULES POWDER COMPANY
INCORPORATED
Cellulose Products Department
905 Market Street, Wilmington, Delaware

RUBBER-BASE (PARLON)® PAINTS

CR51 3

ELECTRICAL EQUIPMENT



Switches, Receptacles for Outdoor Mounting

Outdoor switches and receptacles in a new line come in two basic models—flat units for wall mounting, and curved units for mounting on pipes and poles. Both types have a cast cover and surface plate on which the switch or receptacle is set. The mounting plate is arranged for drilling and tapping of wiring outlet.

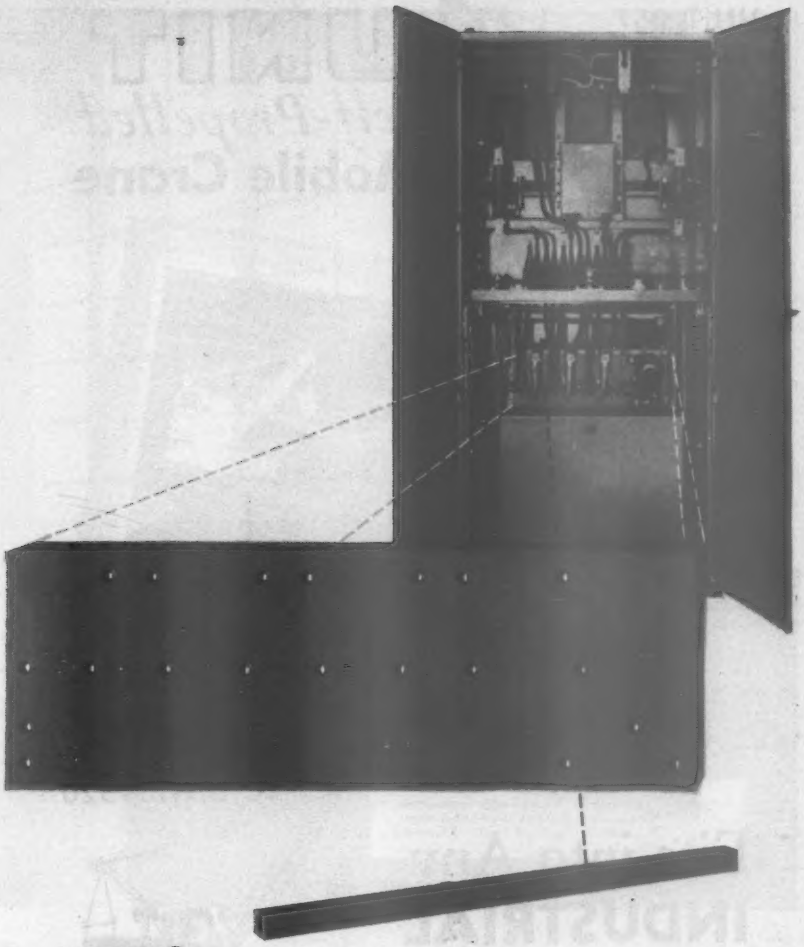
Units are weatherproof. Typical applications would be for portable electric tools and outdoor spotlighting. You can get 2-wire receptacles rated at 15 amp., 125 volts, and 10 amp., 250 volts; or 3-wire units rated at 15 amp., 125 volts, and 20 amp., 250 volts.

Revere Electric Mfg. Co., 6009 Broadway, Chicago 40.

■

PLASTIC-ARMORED METAL TUBING for use where corrosive atmospheres readily attack ordinary conduit is made by Samuel Moore & Co., Mantua, Ohio. A 0.020-in. coating of tough vinyl or polyethylene plastic is extruded over galvanized electrical metallic tubing. Dekoron conduit resists moisture, acids, alkalis, and oils, and is immune to normal temperature changes. Thickness and composition of plastic armor determine dielectric properties.

Turn the page



How about this for a starter?

You are looking at the business end of a synchronous motor starter. The two parts magnified—a shaft insulator and high-voltage panel—are made of Synthane laminated plastics—for good reasons.

Important requirements of the insulator and panel are excellent electrical insulating ability and ease of machining to close tolerances. The shaft has to be dimensionally stable, remain straight and true. The Clark Controller Company found in Synthane the proper combination of properties for these two parts of their 4160 Volt—3 Phase Synchronous Motor Starter.

You may need an entirely different combination for your application. In Synthane you have strength, lightweight, resistance to moisture and abrasion, hardness, denseness, toughness. Synthane is also unaffected by oils, greases, many corrosive atmospheres, gases and solutions. It is available in many grades for easy selection of specific qualities and in various forms such as sheets, rods, tubes or ready-fabricated parts, or may be economically molded from laminated or macerated materials.

In short, Synthane has the right *combination* of properties and forms for electrical, mechanical and chemical jobs in every industry.

Write for the new complete catalog of Synthane Laminated Plastics, containing grades, properties and uses. Synthane Corporation, 4 River Road, Oaks, Pennsylvania.

PLASTICS WHERE PLASTICS BELONG

SYNTHANE

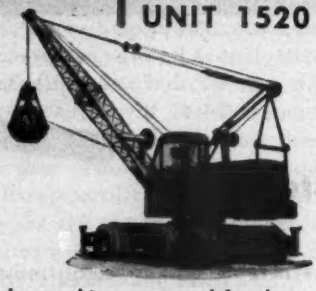
Manufacturers of laminated plastics

UNIT 357

UNIT
Self-Propelled
Mobile Crane

UNIT 1520

Fits into Any
INDUSTRIAL
PICTURE!



You'll find a UNIT Mobile Crane is just the machine you need for the many material handling jobs around your plant. It's self-propelled, rides on rubber, travels anywhere. It has 1001 uses, in and out of yard. Works efficiently even in small yards where space is limited. Controlled and operated by ONE man. Powered by ONE engine. Balanced weight distribution in upper structure adds full-length stability to undercarriage. Provides full-circle, fast-cycle operation. Easy hydraulic steering. Streamlined, FULL-VISION Cab gives operator complete visibility in ALL directions. Promotes safety. Investigate these Mobile Units!

UNIT 357 — Versatile, compact, lightweight Mobile Crane, ideal for your yard lifting and loading jobs. The smoothest operating and easiest handling crane on the market. Mounted on 6 pneumatic tires, duals on rear. Capacity 10 tons. Ask for Catalog L-301.

UNIT 1520 — Heavy-duty, self-propelled Mobile Crane — another UNIT advancement in modern, high-speed, rubber-tired equipment. Lifting capacity up to 20 tons. Mounted on 12 pneumatic tires, with duals on steering axle and tandem rear axles. Ample power for the toughest jobs. Ask for Catalog 502.

UNIT CRANE & SHOVEL CORP., 6602 W. Burnham St., Milwaukee 14, Wis., U.S.A.

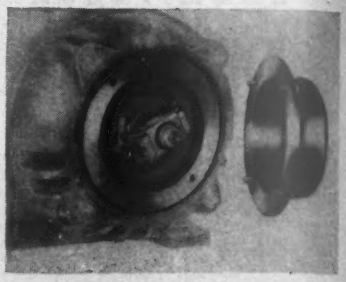
Crawler and Mobile models — ½ and ¾ Yd. Excavators. Cranes up to 20 tons capacity.

UNIT

SHOVELS • DRAGLINES • CLAMSHELLS • CRANES • TRENCHOES • MAGNETS

NEW ELECTRICAL EQUIPMENT

Begins on page 162



A-C Motors With External Switch Housing

This Hoover motor has a totally-enclosed external switch housing. Thus the capacitor switch is mounted in a spot where you can get at it for servicing. Yet it's still fully protected from dust and dirt.

It's one of a new line of NEMA Class C face-mounted single-phase motors. They come in integral horsepower ratings through 3 hp., 3450 rpm.

There are two basic types — horizontal and vertical. Both lines are drip-proof, equipped with heavy-duty ball bearings. Maker says they are suited for continuous-duty operation on pumps and machine tools.

The Hoover people have also announced a similar line of polyphase motors. These have integral horsepower ratings through 5 hp., 3450 rpm.

The Hoover Co., 101 Maple St., N. Canton, Ohio.

■

HEAVY-DUTY MASTER SWITCH redesigned by General Electric Co., Schenectady 5, N. Y., now has cast aluminum cover and five adjustable stops. Switch is designed for mill-type cranes, other large handling equipment. Aluminum cover is easy to remove for inspection, says G-E, and still offers good protection to switch interior. Adjustable stops provide one to five points of movement in either direction.

Turn the page

Instrument shop of the E. H. Sargent Company, manufacturers of scientific instruments. Architect: Olsen & Urbain, Chicago.

Work is easier, faster, safer with...

FILTERED DAYLIGHT

This machine operator could tell you what it does for him.

He'd tell you that the lighting in this room makes his work easier . . . helps him hit those close tolerances right on the nose. That his eyes don't get nearly as tired. He'd tell you that he stays cooler in summer, too.

The Blue Ridge Frosted *Aklo** Glass in those windows filters most of the glare out of sunlight . . . like sunglasses. Cuts sun heat as much as 44%.

BLUE RIDGE
***AKLO* GLASS**

You'll see blue-green Frosted *Aklo* in a lot of new plants that have geared up for top-speed production. Particularly on the south, east and west elevations.

Prove to yourself how it cuts down glare and sun heat. Ask your Libbey·Owens·Ford Glass Distributor for a Radiometer demonstration of its effectiveness . . . right on your desk. Or mail the coupon. *®

FREE BOOK on Reduction of Sun Glare and Heat

Blue Ridge Sales Div., Libbey·Owens·Ford Glass Co.
B-16121 Nicholas Building, Toledo 3, Ohio

☐ Please send me your book "Filtered Daylight".
☐ I would like to see a Radiometer demonstration.

Name _____ (please print)
Company _____
Address _____
City _____ State _____

KENNEDY

bronze globe and angle valves . . .

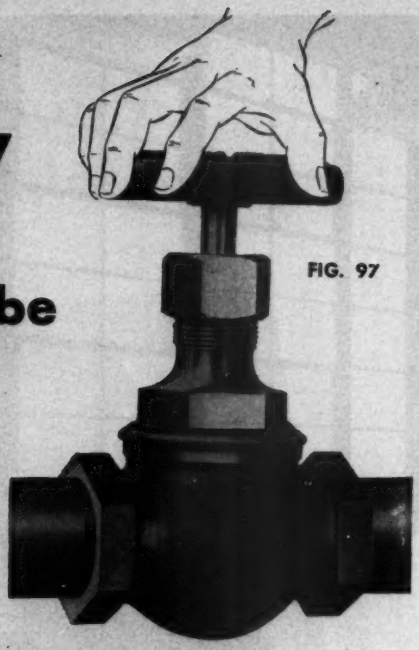


FIG. 97

JOB-FITTED with the *right* disc for every service

FIG. 98

TO ASSURE LONG, TROUBLE-FREE OPERATION with easy maintenance, the complete KENNEDY Line is *job-fitted* . . . every valve specially designed and engineered for the job it has to do.

IN THE KENNEDY FIGS. 97 and 98, for example, the disc is exactly matched to the job. To meet a wide range of fluid, temperature and pressure requirements, a variety of disc materials is available. Each is carefully selected for the service for which it is recommended.

THE RENEWABLE COMPOSITION DISCS give longer service because the extra height of the raised seats utilizes full thickness of the disc before replacement is necessary. The disc holder swivels on the stem to allow uniform wear on the disc.

THE MOLDED PACKING is self-lubricating and both Fig. 97 and Fig. 98 can be readily repacked under full pressure.

THE HEAVY-WALLED BODIES are ruggedly built with full rounded contour. The stems are made with manganese bronze of 50,000 lb. tensile strength and have unusually heavy threads. Parts are fully interchangeable. Sizes range from ¼ to 3 inches with a working pressure of 125 lbs. saturated steam, WRITE FOR BULLETIN 56.

BUY FROM YOUR LOCAL DISTRIBUTOR

Est. 1877

THE **KENNEDY**
VALVE MFG. CO. • ELMIRA, N.Y.

VALVES • PIPE FITTINGS • FIRE HYDRANTS

NEW ELECTRICAL EQUIPMENT

Begins on page 162

Direct-Acting Magnetic Brake

The Dings brake is said to stop any motor, hold the load, and then release without any drag. It's an a-c or d-c direct-acting, disc-type magnetic brake.

The brake is spring engaged and magnetically released. You mount it on NEMA Type C motor flanges. Suggested applications are machine tools, hoists, cranes, elevators, etc.

Maker points out that the brake has no solenoids or mechanical linkages. Thermal rating is said to be very high. You make torque and wear adjustments through a double set of lock nuts.

You can mount standard Dings units on horizontal motors. But they can be adapted to vertical mounting. And it's not necessary to dismantle the brake or disturb the torque setting in order to mount the unit.

Brakes are fully enclosed, drip-proof, and weather-proof. Special enclosures are available.

Dings Brakes, Inc., 4740 W. Electric Ave., Milwaukee 46.

■

Self-Breaking Variable Drive Unit

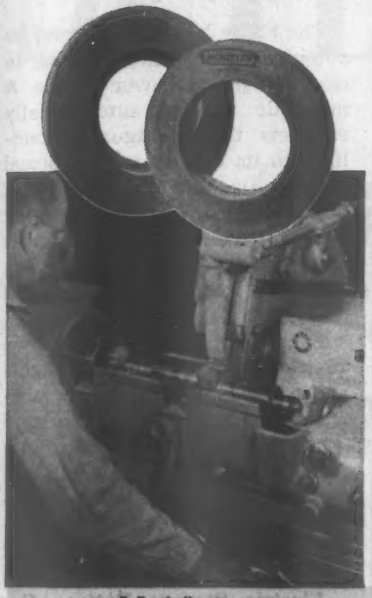
The brake on this drive unit is mounted directly on the variable speed shaft. There's no need for transmission of the braking action through the drive belt. Maker says this arrangement is ideal for inching or jogging. The brake provides immediate, shockless operation without noise.

You can adapt the brake to both U. S. Varidrives and Varidrive-Syncrogears. It is d-c actuated, with maximum power requirement of about 25-35 watts. Power conversion units are available for an a-c input.

U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles.

Turn the page

Protect YOUR O.D. GRINDING INVESTMENT with Norton Wheels



Roll-grinding to a super-fine finish

Roughing drill rod in through-feed centerless grinding

No chain can be stronger than any of its links — and no grinding machine can be more efficient than its grinding wheels.

That's why your choice of wheels for O.D. grinding — cylindrical or centerless — calls for every bit as much care as your choice of machines. Because without the *right* wheels the costliest equipment is just so much inefficient machinery. And remember:

No matter what your O.D. grinding jobs are, Norton makes wheels that are exactly right for them. And your Norton Distributor is ready to tell you exactly which wheels you need.

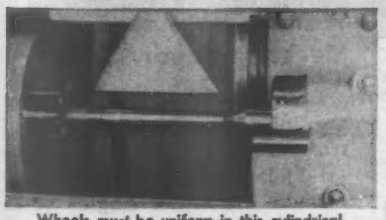
Norton Safeguards for Lower-Cost Grinding

Norton Abrasives, ALUNDUM* (fused alumina) and CRYSTOLON* (silicon carbide) are made in a variety of types and grain sizes for best results on every material handled in centerless or cylindrical grinding.

Norton Bonds, vitrified, resinoid, shellac and rubber are available for cool, free cutting action, extra long wheel life and just the finish you want.

Norton Service includes the most comprehensive applicational aid in the field. And if your problems are unusual, your distributor can call on a Norton Abrasive Engineer to give you double assurance of the right wheel for every job.

These O. D. Grinding Machines Are Paying Off...WITH NORTON WHEELS



Wheels *must* be uniform in this cylindrical setup for grinding seven diameters at once

Multiple diameter centerless grinding also requires high standards of wheel uniformity

Cylindrical shoulder grinding, with 45° angular wheel head

Through-feed centerless grinding gives high production

GET THE FACTS YOU NEED TO KNOW

This 40-page illustrated booklet is packed with up-to-the-minute information on every phase of cylindrical and centerless grinding applications, including handy selection charts for your general guidance. Ask your Norton Distributor for *The A.B.C. of O.D. Grinding*, or write direct for Form 2006. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

NORTON ABRASIVES

Making better products to make other products better

28 MILES of REINFORCING RODS in a Skylight!

An average translucent Corrulux structural panel* contains 28 miles of tiny glass fiber reinforcing rods for strength and your protection. Recent developments have made possible production of tiny glass rods with tensile strengths of *over 100,000 psi!*

This reinforcing makes Corrulux shatterproof and strong, ideal for skylighting, sidelighting and partitioning.

Corrulux diffuses daylight for soft, interior lighting without eye strain.

Corrulux nests snuggly with standard roofing and siding . . . nails, drills, bolts and saws easily . . . can be installed by anyone, on standard purlin spacings, without expensive framing and flashing.

Corrulux requires no maintenance . . . resists sun, wind, rain, hail, temperature extremes and virtually all industrial fumes . . . is highly resistant to sharp impact, vibration and shock.

Corrulux cuts skylighting costs up to 50% in new or remodeled plant buildings.

*** 10 feet long x 27½ inches wide.**

DISTRIBUTORS IN PRINCIPAL CITIES

AVAILABLE IN SIX BEAUTIFUL COLORS FOR

- Ceilings
- Movable Screens
- Displays
- Offices
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- Toilet Partitions
- Canopies
- Awnings

Corrulux CORP.

Dept. E, P. O. Box 20,026, Houston 25, Texas

Please rush FREE literature and name of my nearest distributor.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

Begins on page 136

LIGHTING

Battery-Powered Emergency Light

The Exide Lightguard provides automatic emergency lighting in case of lighting power failure. A magnetic switch automatically connects the Lightguard floodlight to its battery when normal current is interrupted. When power service is restored, a relay turns off the floodlight and turns on a charging unit. When not in use, the battery is kept full charged by its electric circuit.

Each Lightguard has one or two 25-watt sealed-beam floodlights and a thick-plate, glass-jar storage battery. The adjustable lamp will illuminate up to 4000 square feet. A single lamp unit will still be providing 70% of peak illumination after six hours of continuous operation. Unit is about the size of a portable typewriter.

Electric Storage Battery Co., 1950 Allegheny Ave., Philadelphia 32.

■

Transformers for Mercury Vapor Lamps

Both indoor and outdoor types are included in a new line of transformers for mercury vapor (H-1) lamps. The indoor transformers are either single- or 2-lamp units — normal and high power factor — for 115- and 230-volt circuits.

Transformers have ½- and ¾-in. knockouts. Several primary voltage taps permit close matching to the line voltage.

The outdoor line includes aerial, pole top, pole base, and vault types for boundary and building exterior lighting.

Jefferson Electric Co., Bellwood, Ill.

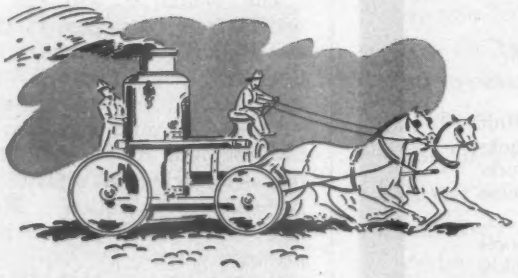
Turn the page

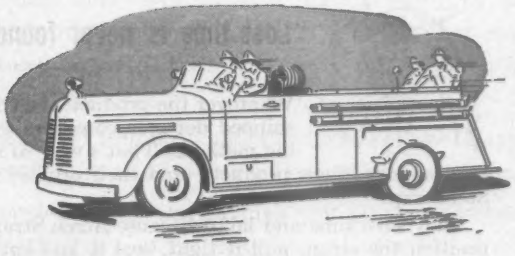
Now! Fenwal

DETECT-A-FIRE

unit brings you unique, new

rate compensation fire detection





AS DIFFERENT from existing principles of fire detection as the fire-fighting equipment above!

Visit our Booth 603 at the Chemical Industries Exposition, Grand Central Palace, N. Y.

Why risk *lives* and costly property replacement due to undetected fires? With unique, DETECT-A-FIRE units you do away with time lag, false alarms. Based on a new rate-compensation principle of fire detection, these units respond *only* when the temperature of the surrounding air reaches predetermined danger level. Recommended for plants, ships, institutions, commercial, mercantile, and public buildings. Listed by UL. Approved by USCG — U. S. Coast Guard.

PLEASE SEND ME THE BASIC FACTS about the new Fenwal DETECT-A-FIRE unit for institutional, commercial, mercantile, industrial, and marine locations.

Name ..... *Position* .....

Company .....

Street .....

City ..... *Zone* ..... *State* .....

Fenwal

DETECT-A-FIRE

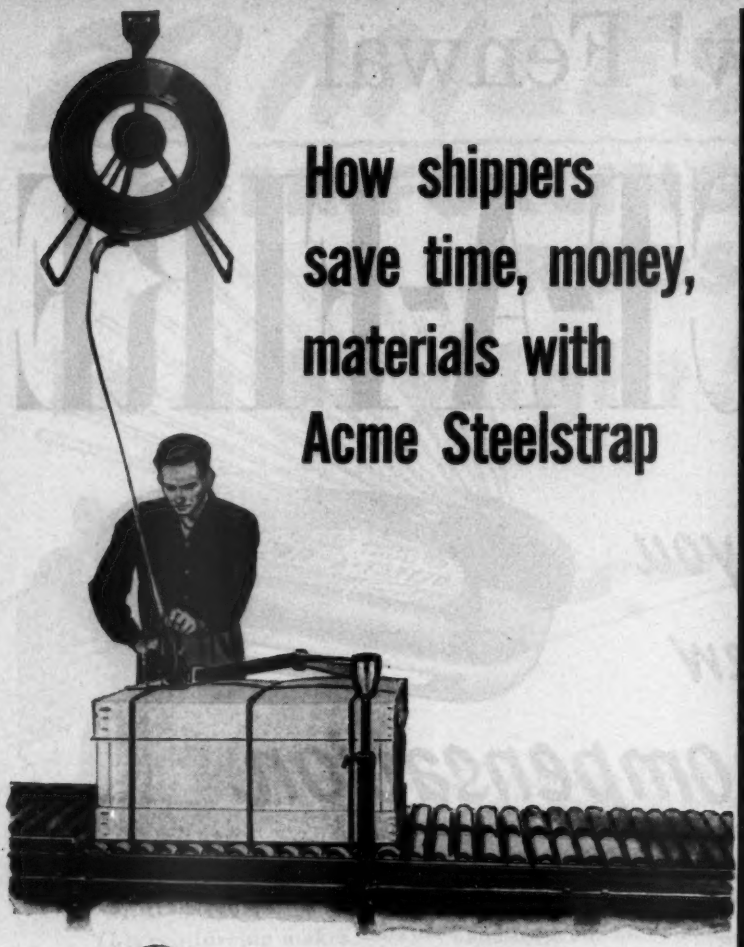
Precise, DYNAMIC Fire Detection

FENWAL, INCORPORATED

612 Pleasant Street, Ashland, Mass.

111 South Burlington Avenue, Los Angeles 4, Cal.

Temperature Control Engineers



How shippers save time, money, materials with Acme Steelstrap

"Lost time is never found again."
—Ben Franklin's Almanac, 1757

Whatever the product, the cost per unit shipped depends considerably on packing methods. That's why so many companies secure their products (and their profits) with Acme Steelstrap.

They save time and labor because Acme Strapping tools position the strap, pull it tight, seal it and cut it quickly and easily.

They save on shipping costs because Acme Steelstrap cuts weight and bulk, reduces storage space, cuts loading time, minimizes damage in transit.

For example, a window shade manufacturer (picture above), credits labor savings of 25 per cent and increased orders handled of 30 per cent to an improved materials handling setup based on using Acme Steelstrap.

We are looking forward to the day when we can supply Acme Steelstrap to everybody who wants it, in the quantities they want it. In the meantime, why not get all the information you can about it? Ask your Acme Steel representative for details, or write Dept. FM-121.

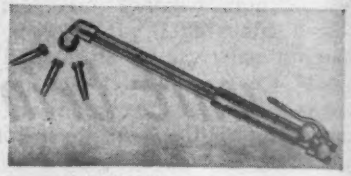
ACME STEEL COMPANY
2840 Archer Avenue, Chicago 8, Illinois

ACME STEEL

Steel Strapping — Stitching Machines and Wire — Venetian Blind Slat Stock — Corrugated Fasteners — Strip Steel

WHAT'S NEW IN EQUIPMENT
Begins on page 136

MAINTENANCE TOOLS & SUPPLIES



Head-Mixing Acetylene Torch

The Model D Hi-Speed cutting torch mixes its oxygen and acetylene at the cutting head—instead of in the center block. This design, says the Dockson Corp., provides better torch balance, lower total weight (39 ounces). The torch is especially recommended for long, steady work.

The Model D will cut any weight from light-gage to 10-in. steel. Pure copper tips in sizes 0 through 8 have four or six precision-drilled pre-heat orifices.

Carefully machined flat-on-flat coupling for tip and head makes changing tips a faster, less bothersome operation. Maker also points to improved high-pressure valves.

Dockson Corp., 3839 Wabash Ave., Detroit 8.

■

PIPE DE-SCALING ATTACHMENT for Steen cut-off machines can be a big help in reclaiming used pipes and tubes. One pass through the rollers of this attachment removes rust, scale, other deposits. It will clean pipe up to 12 inches in diameter at speeds up to 20 feet per minute, according to the Continental Machine Co., 1952 N. Maud Ave., Chicago 14.

Turn the page

It's sound practice to specify G-E motors—sound practice, too, to make sure you get the *right* General Electric motor for the job . . . via Graybar.

Service under all conditions proves the rugged reliability of the entire G-E Tri-Clad line—motors that are built to take a physical beating . . . built to deliver smooth, steady power *when* and *where* you need it.

Let Graybar be your motor advisor. Your local Graybar Representative can help you match up motors with machine-drive requirements . . . help you analyze service conditions requiring special types such as totally-enclosed motors, variable speed motors, gear motors, reversible motors.

He can also provide details on the G-E Motor Exchange Plan. Covering popular fractional and integral ratings, this plan makes emergency replacement of inoperable motors a simple over-the-counter transaction.

If your production needs more motor horsepower—

Look behind the Graybar tag

G-E quality plus Graybar service. Graybar distributes G-E controls to match the operating conditions of any motor. A Graybar Power Apparatus Specialist will be glad to recommend the type that's best for your requirements. Call on him, too, for qualified help in choosing transformers, switchgear, circuit breakers, capacitors, and other items for inter-plant distribution.

Before you buy your next motor—or for that matter, anything electrical — discover for yourself the many helpful services that stand behind the Graybar tag — services that even today can help you buy with greater speed and efficiency.

A far-flung network of over 100 offices and warehouses places Graybar facilities conveniently close-at-hand — regardless of your location.

Local Graybar Representatives can furnish you or your electrical contractor with practical advice on the installation and usage of most every-day electrical items. On out-of-the-ordinary installations or where you desire specialized technical information he can provide the additional assistance of experienced Graybar Specialists.

Your near-by Graybar office also maintains a comprehensive information service covering all of the more than 100,000 electrical items distributed by Graybar — you'll find it useful in the preparation of job specifications and in the arrangement of practical delivery schedules.

177-1112

GRAYBAR ELECTRIC COMPANY, INC.
Executive Offices:
Graybar Building, New York 17, N. Y.

Avoid electrical delays—plan ahead . . . via GraybaR

IN OVER 100 PRINCIPAL CITIES

NOT THAT ONE CURLEY... IT DOESN'T HAVE TO BE DUMPED AND REFILLED EACH YEAR!

Maintenance costs for Ansul Dry Chemical Fire Extinguishers are negligible. No annual recharge is necessary. Ansul *"PLUS-FIFTY"* Dry Chemical maintains its superior fire-killing characteristics indefinitely . . . and factory-filled Ansul gas pressure cartridges are guaranteed against leakage.

Ansul Extinguishers are your best protection for flammable liquid, gas and electrical fires. They save you money two ways . . . lower fire losses (including lost production time) . . . and lower maintenance costs.

SEE PAGE 206

THE RIGHT **BALL**

Let Strom Help You

Not only in precision ball bearings, but in countless other places, Strom has found that the right ball will do the job better. Maybe your problem can be solved with the use of the proper ball. Why not take it up with Strom.

Strom has been making precision metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity and dependable physical quality, there's not a better ball made.

Strom STEEL BALL CO.
1850 So. 54th Ave., Cicero 50, Illinois
Largest Independent and Exclusive Metal Ball Manufacturer

NEW MAINTENANCE TOOLS & SUPPLIES

Begins on page 170

Movable Frame Press for Awkward Parts

It's always a problem to press, bend, or straighten parts so big or awkward they must be moved by overhead handling equipment. To make the job an easier one, the Dake people have designed a line of hydraulic presses with movable frames.

With a Dake press, you can move the press frame out of the way, lower the bulky work piece by crane, then move the frame back into position. The work head can be adjusted both laterally, longitudinally, and up and down.

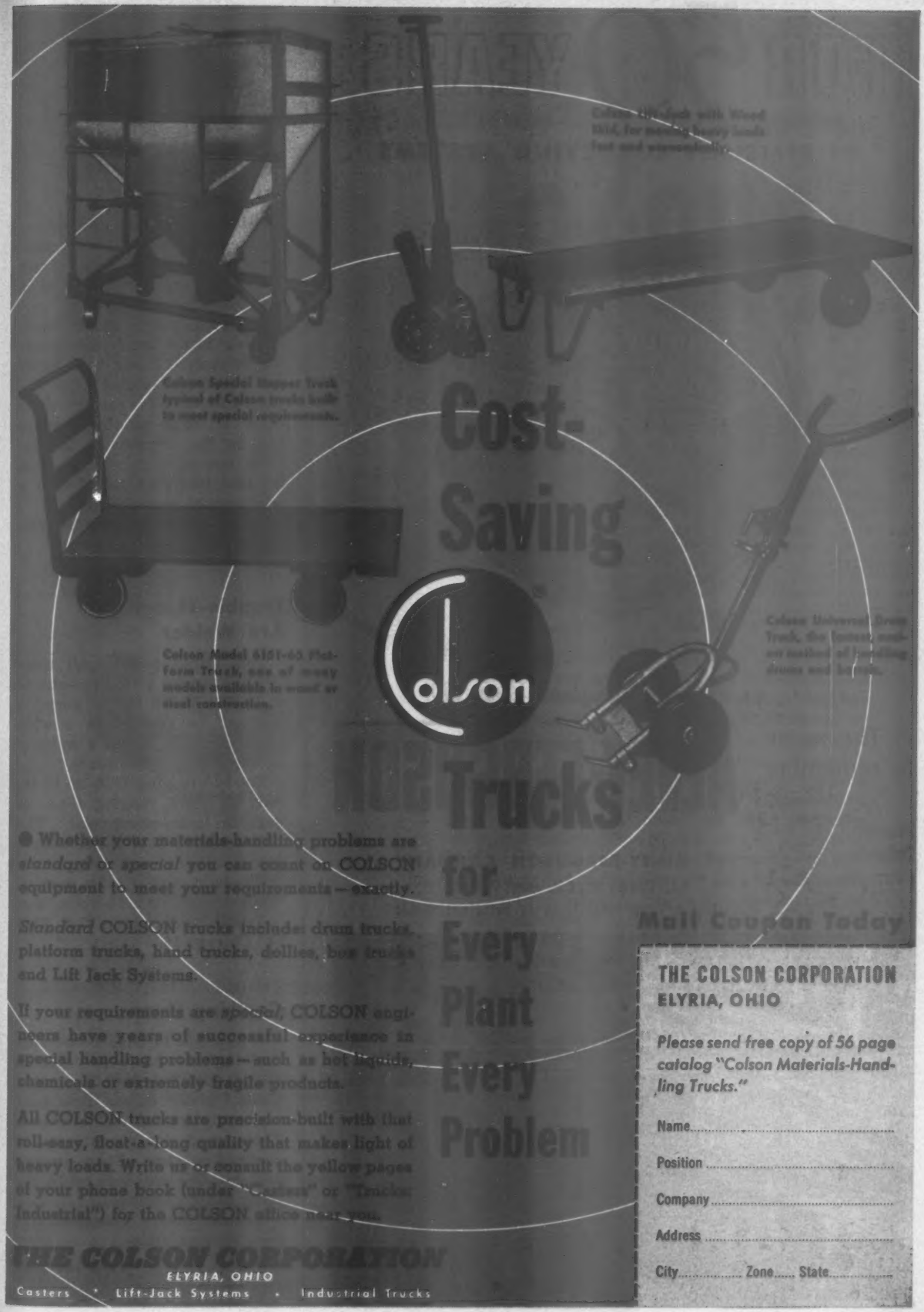
You can get these movable frame presses in 25-, 50-, 75-, and 125-ton capacities. They are equipped for either electric or air-powered hydraulic operation. You'll find full details in company bulletin No. 269.

Dake Engine Co., Grand Haven, Mich.

■

SPECIFIC STANDARD TAPS are taps designed to cut one class of metals with maximum efficiency. You can get them for steel, cast iron, aluminum, magnesium and light materials, zinc die casting metals, brass, and plastics from Detroit Tap & Tool Co., 415 Boulevard Bldg., Detroit 2.

Turn the page



● Whether your materials-handling problems are *standard* or *special* you can count on COLSON equipment to meet your requirements—exactly.

Standard COLSON trucks include: drum trucks, platform trucks, hand trucks, dollies, box trucks and Lift Jack Systems.

If your requirements are *special*, COLSON engineers have years of successful experience in special handling problems—such as hot liquids, chemicals or extremely fragile products.

All COLSON trucks are precision-built with that roll-easy, float-a-long quality that makes light of heavy loads. Write us or consult the yellow pages of your phone book (under "Casters" or "Trucks, Industrial") for the COLSON office near you.

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ELYRIA, OHIO
Casters • Lift-Jack Systems • Industrial Trucks

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OF EFFICIENT CONVEYING SYSTEMS

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Write for Complete Information

THE ALVEY-FERGUSON COMPANY
142 Disney St., Cincinnati 9, Ohio
Offices or Representatives in Principal Cities

NEW MAINTENANCE TOOLS & SUPPLIES

Begins on page 170

Easy-to-Drive Screwdrivers

Palm-Grip ratchet screwdrivers are designed for speedy, comfortable operation. There are two pieces—the screwdriver and a detachable palm grip.

The palm grip is shaped to fit securely in the hand when turning screws It has a built-in 3-position drive ratchet. The extended shaft of the ratchet mates with a corresponding square hole in the screwdriver handle. Thus, one palm-grip ratchet can be used interchangeably with a whole set of screwdrivers.

Kipton Industries, Norwalk, Ohio.

Trouble-Shooting Arc Welder

The Trindl people call their new arc welder a "trouble-shooter." The Model 80A is portable and can be adapted to a wide range of work. It has a welding range of 20 to 80 amperes.

The 80A handles 1/16- to ⅛-in. rods on work ranging from 24 gage to ¼-in. sheetmetal. The unit has nine heat stages adaptable to either arc welding process or the twin carbon torch process. Welder runs on 110-volts, a-c.

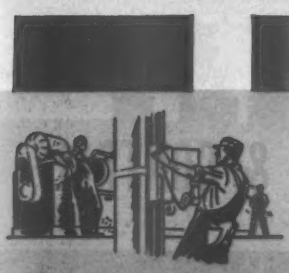
Trindl Product Ltd., 17 E. 23rd St., Chicago 16.

Caulking Guns

A new line of trigger-operated caulking guns has been designed for use with Rub-Bub Chromated Caulk. Maker claims these guns are easily loaded and operated. Their small size permits use in confined quarters. There are two models. One uses bulk caulk, the other caulk cartridges.

Samuel Moore Chemical Co., Inc., Mantua, Ohio.

Turn the page

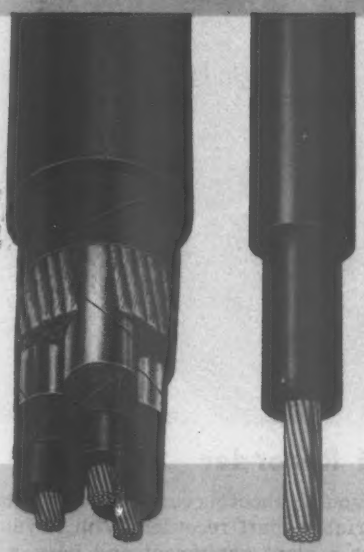


How You Can Prevent Costly Power Stoppages...

RoZone®

INSULATED CABLE

You can always count on Rome RoZone Insulated Cables to keep power flowing even under the toughest plant conditions. A premium oil-base insulation, RoZone has high dielectric strength and superior resistance to corona and ozone cutting, where high voltages are involved. That, coupled with an exceptional ability to withstand the effects of moisture, heat and aging make RoZone a sure bet in preventing costly power stoppages due to cable failure.



Unretouched photo of RoZone specimen after long-time ozone test.

Unretouched photo of conventional rubber specimen after short-time ozone test.

For Double Protection
RoZone-RoPrene

Here's a cable combination that gives you all the excellent protective features of RoZone insulation—*plus* an all-resistant RoPrene (Neoprene) sheath. RoPrene has strong abrasion resistance . . . is unaffected by oils, acids, alkalies, moisture and flame. It is the ideal alternate for heavier and more expensive lead sheath.

A "natural" for plant power distribution systems, RoZone-RoPrene is proving its worth in paper mills, chemical plants, steel mills and other industries throughout the country. It's available as a single or multiple conductor for service ratings up to 8000 volts. It may be installed direct in earth, in conduits, in racks or trays, aerially . . . or in combination circuits.

The Rome Power and Control Cable Catalog will show you why it will pay you to specify RoZone-RoPrene. Mail the coupon today for your copy.

ROZONE INSULATION POSSESSES

- High dielectric and impulse strength
- Excellent resistance to corona and ozone cutting
- Remarkable electrical stability in water
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Copper wire mill products are a Controlled Material under N.P.A. Controlled Materials Plan. USE YOUR CMP ALLOTMENT.

It Costs Less To Buy the Best

ROME CABLE CORPORATION, Dept. FM-12, Rome, N.Y.

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SLY

Pioneers and Leaders in INDUSTRIAL DUST CONTROL

This Filter ventilates Blast Rooms and Cabinets in an aircraft engine overhaul shop. Exhaust fan is located in fan house on end of dust filter.

SIMPLE, EFFECTIVE SHAKER MECHANISM KEEPS FILTERS AT TOP EFFICIENCY

Sly Dust Filters collect dust by filtration of the dust-laden air through cloth—*they get all the dust.*

They collect the dust on the *outside* of *flattened* cloth tubes (bags)—visible and easily accessible for inspection and maintenance.

To maintain collecting efficiency, the dust must be periodically shaken from the bags. The effectiveness of the Sly Shaker Mechanism is one of the outstanding advantages of the Sly Dust Filter. It operates year after year with little, if any, maintenance and keeps the collector at top efficiency.

It will pay you to look into the many advantages of Sly Dust Filters. Ask for Bulletin 98.

A complete line including small "Unit" filters for smaller operations.

THE W. W. SLY MANUFACTURING CO.

4755 Train Avenue • Cleveland 2, Ohio

New York • Chicago • St. Louis • Philadelphia
Detroit • Minneapolis • Birmingham • Cincinnati
Los Angeles • Rochester • Toronto

MEASURING & CONTROL

Portable Chart Recorder

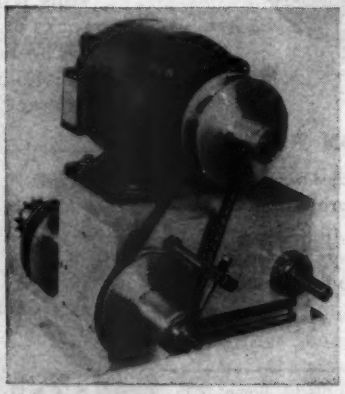
Here's a convenient trouble-shooting combination—a clamp-on ammeter and a portable chart recorder. With it you can make spot checks on a-c plant equipment and have a permanent record of the readings. There's also a portable multipoint recorder that you can use with four clamp-on ammeters to check 3-phase systems.

Tagliabue Instruments Div., Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark, N. J.

■

V-Belt Drive for Calibration

You can calibrate controllers, tachometers, and similar instruments with this compound V-belt drive. Drives range from ½ to 10 hp. Speeds from 150 to 7500 rpm. are obtained by compounding successive pairs of combination sheaves.



There's no hunting, little drifting, says the maker. So speed variation is held to ¼ to 1% throughout the entire range.

Maker will furnish the drives with standard NEMA motors of any desired electrical characteristics, either open or explosion-proof. Single control for either direct or remote operation changes the pitch diameter of all sheaves simultaneously.

Speed Selector, Inc., 118 Noble Court, Cleveland 13.

Turn the page

MORE KVA PER POUND!

Lightweight, dry-type transformers save space, cut installation costs. 3 through 167 kva, single phase, or 9 through 225 kva, three phase.

They're lighter and smaller! Compact, completely ventilated coils on Hipersil® cores—neatly enclosed in sheet steel cases for convenience of mounting, cleanliness, trim appearance.

Add all this to the savings inherent in dry-type transformer design:

NO VAULTS. Mount them on the floor, walls, posts or overhead platforms, close to the load they serve. They're safe.

SIMPLIFIED MAINTENANCE. No liquids to store, filter or replace. No gauges, radiators, valves or gaskets to get out of order.

Westinghouse Dry-Type Transformers are available for voltage step-down or step-up applications or for phase changing. Types AJRB and AVRB (3 through 100 kva) have circuit breakers built into the high-voltage circuit, giving 3-way protection against damaging overloads or short circuits, cutting installation time up to 50%. Ask your Westinghouse representative for a copy of B-4428, or write Westinghouse Electric Corporation, P. O. Box No. 868, Pittsburgh 30, Pennsylvania. J-70607

YOU CAN BE SURE... IF IT'S Westinghouse

DRY-TYPE TRANSFORMERS

SHENANGO Centrifugal CASTINGS ... KEY TO SAVINGS

Typical of some of the larger parts cast centrifugally and precisely finished at Shenango, this is a 45" cylinder bushing for use in a big hydraulic metal forming press.

CENTRIFUGALLY CAST BY SHENANGO . . .

for a longer life under pressure

THERE'S a way to save important money on symmetrical parts subjected to high pressures and stresses. You can do as so many companies do—turn to Shenango for *centrifugally* cast parts or assemblies . . . large or small . . . ferrous or non-ferrous . . . semi-machined or precisely finished to specifications.

At the modern Shenango works you'll gain by the most advanced techniques in centrifugal casting. Metal for metal you get greater strength and better resistance to wear or abrasion, to say nothing of relief from sand inclusions, blow holes and other often hidden defects.

GET ALL THE FACTS on Shenango time-and-money-saving service and qualities. Send for Bulletin No. 150 on non-ferrous parts; Bulletin No. 151 covering parts of Meehanite Metal, Ni-Resist and special alloy irons.

SHENANGO-PENN MOLD COMPANY
2890 West Third St. • Dover, Ohio
Executive Offices: Pittsburgh, Pa.

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ALL RED BRONZES · MANGANESE BRONZES · ALUMINUM BRONZES
MONEL-METAL · NI-RESIST · MEEHANITE METAL

NEW MEASURING & CONTROL APPARATUS

Begins on page 176

Electronic Manometer and Flowmeter

This device has no glass or plastic tubes, contains no fluids. Yet it doubles as both a manometer and flowmeter. Operation is based on use of noble-metal thermopile and electronic circuits.

It's as simple to use as a standard U-tube manometer, claims the maker. There are just two tap connections to be made to the liquid line to be measured.

The manometer measures extremely low pressure differentials. Total range is 0.001 to 2 inches of water. You can use the instrument for direct readings or attach it to a recorder. Calibration and accuracy are not affected by the length of extension cables.

A 5-position switch permits monitoring of five stations. Power is 110 volts, 60 cycle.

Hastings Instrument Co., Inc., Super Highway & Pine Ave., Hampton 10, Va.

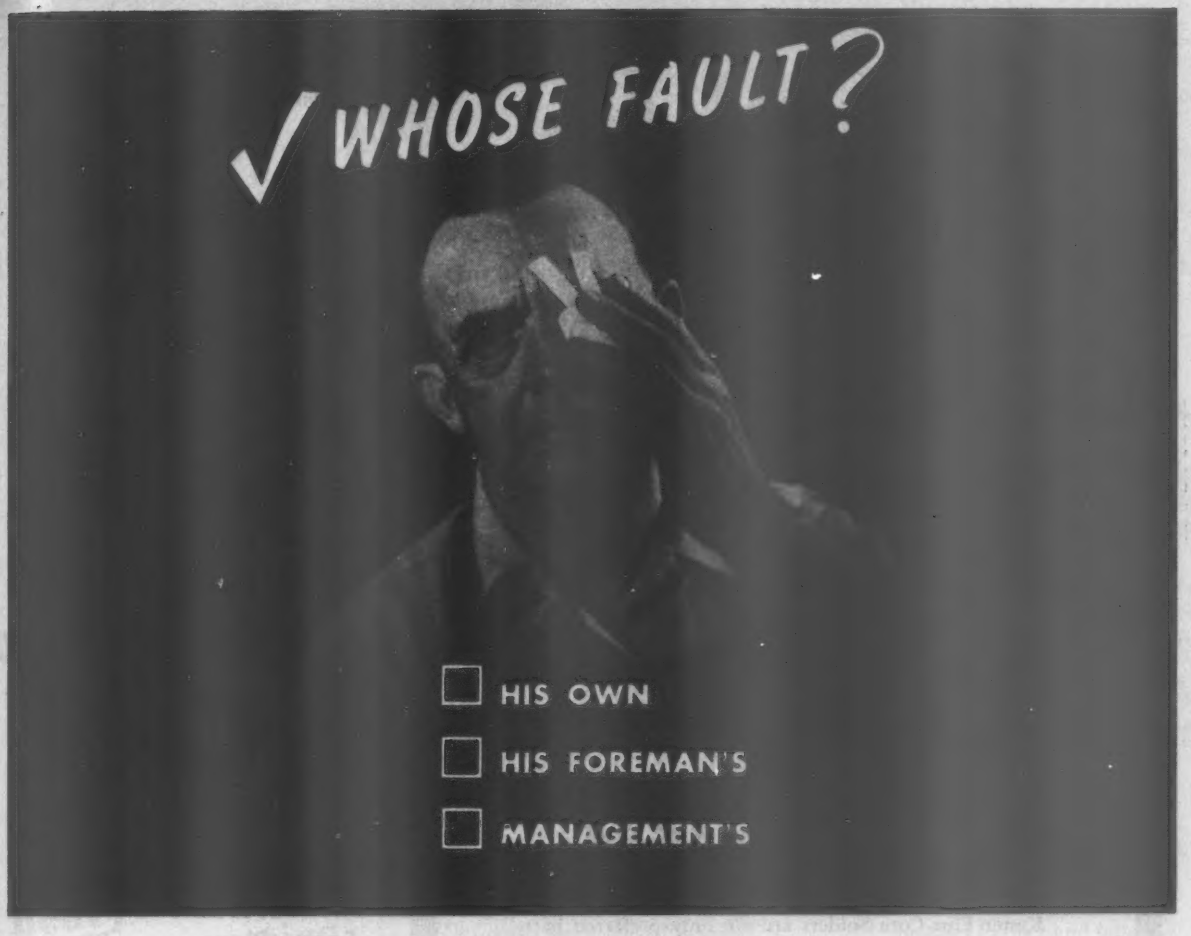
■

COMBUSTIBLE GAS ANALYZER has a new thermocouple arrangement that gives more stable readings, reduces zero drift to a minimum. It's designed for process control work, especially where constant supervision is not available. You can use it for remote head operation, or in tube sampling systems, according to the Davis Emergency Equipment Co., 57 Halleck St., Newark 4.

LIMITED BUDGET LABORATORY is the name of a packaged test and inspection kit produced by George Scherr Co., 202 Lafayette St., New York 12. It's a collection of all the gages, micrometers, microscopes, etc., needed to meet Military Specifications MIL Q 5923 (UDSF) for inspection and production tooling.

Turn the page

Cash in your Scrap!



1 **SELL EYE SAFETY TO EMPLOYEES**
Ask your distributor's representative to show you the kit of posters, pay envelope inserts, PA system scripts and other material that sells workers forcefully on *desire to use* proper safety eyewear.

2 **SAFETY GLASSES FOR EACH JOB**
A complete range of Bausch & Lomb safety eyewear, engineered to meet the most rigid tests for each job classification in your plant.

3 **PROTECTION *PLUS* CORRECTION**
For at least 50% of your workers prescription lenses are necessary to working efficiency as well as to safety. Your B&L distributor offers prompt prescription service on all types of industrial eyewear.

EYE accidents happen to those who invite them, sure—but are you sure this man understood the consequences of working without safety eyewear?

Casualty companies have long agreed that a *total* eye safety program must include education of workers by management.

Bausch & Lomb is prepared to assist with a forceful educational program. It's part of a *total* eye safety service you can put into operation immediately. Write Bausch & Lomb Optical Co., 650-12 St. Paul St., Rochester 2, N. Y.

BAUSCH & LOMB *Safety Eyewear*

Kester Solder

Delicate fabrication or massive work, Kester makes a specialized flux - core solder (over 100,000 different types and sizes) that will do the job perfectly. Kester Solders are made only from the finest grades of tin and lead commercially available.

Preferred

Kester Flux-Core Solders are not only preferred by industry, but individual workers also insist upon Kester to enable them to do their best work with a minimum of rejects.

Saves Time

A Kester Technical Engineer, with his wide experience in industry, will specify the most efficient flux-core solder for your operation and will suggest the best method of application.

Kester Solder Company
4201 Wrightwood Ave., Chicago 39
Newark, N. J. Brantford, Canada

Send for free manual "SOLDER and Soldering Technique"

KESTER SOLDER

Standard for Industry since 1899

WHAT'S NEW IN EQUIPMENT
Begins on page 136

PLANT HOUSEKEEPING & SANITATION

Maneuverable Snow Plow

This rotary snow blower has six forward and two reverse speeds—ranging from 1/3 to 2¾ mph. And the wheels have independent clutches so that they can turn independently in close quarters. All of which makes this snow plow a highly maneuverable unit even in a heavy snow.

The Toro Snow Boy will bite out a ton of snow a minute, throw it up to 65 feet away in any direction the operator chooses. It clears a 33-in. path.

Toro Mfg. Co., 3042 Snelling Ave., Minneapolis, Minn.

■

Hydraulic Lift for Snowplows

The National Lift Co. makes a hydraulic lift that you can install on your own truck - mounted snowplows. The unit provides quick lift of the snowplow at the

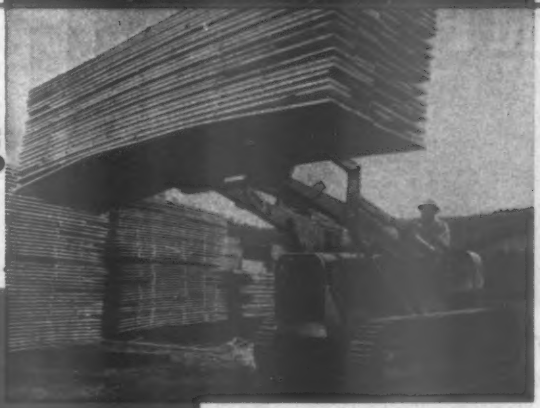
For Handling a Number of Jobs . . .

Loading foundry sand into an elevator is just one of the tasks performed by this Allis-Chalmers HD-5G Tractor and Tracto-Shovel. It also breaks up and loads slag, removes snow, cleans out dust hoppers, handles coal, spots railroad cars, carries heavy castings from one department to another. Fourteen quick-change attachments multiply its usefulness, keep it busy the year-round.

For Saving Critical Production Time . . .

This HD-5G adds valuable days to the steel production time of 14 open-hearth furnaces. In cleaning out slag pits, it releases 13 laborers for other work, gets the job done in a fraction of the time. With trench hoe attachment, it tears out old lining brick to speed rebuilding of furnaces. Used also for loading wet loam, moving and placing machinery, excavating, other jobs.

For Heavy Lifting, Carrying, Excavating



Bucket is replaced by lift fork attachment in a few minutes' time, and the HD-5G easily handles lumber and other palletized loads in two-ton "bites." (Larger models have lifting capacities ranging up to 12,000 lb.) A-C crawlers have the stability for rough terrain — the power, weight and traction to work anywhere.

. . . choose an A-C Tractor with Tracto-Shovel Attachments

There's a size to fit your needs

	HD-5G	HD-9G	HD-15G	HD-20G
Horsepower	40.26 (drawbar)	72 (drawbar)	109 (drawbar)	175† (net engine)
Total Weight	16,200 lb.	29,800 lb.	40,000 lb.	61,600 lb.
Bucket Size	1 — 2 yd.	2 — 4 yd.	3 — 5 yd.	4 — 7 yd.
Dumping Height*	9 ft. ¼ in.	11 ft. 4½ in.	12 ft. 8 in.	13 ft. 5 in.

*Height of Bucket Hinge

†Torque Converter Drive

Interchangeable Attachments

Include standard, light-materials and heavy-duty buckets — bulldozer blades — lift or rock forks — plus other attachments for some models.

ALLIS-CHALMERS

TRACTOR DIVISION · MILWAUKEE 1, U. S. A.

Standard builds conveyors of many kinds and types for a wide range of industries...

Knowing how to put conveyors to work to best advantage in your business or industry is equally important to Standard Conveyor as building the best conveyors.

An experience record of more than 45 years, building conveyors for industries as highly diverse as those pictured above, means that Standard Conveyor can serve you right — with the right type of conveying equipment for your particular needs — a complete engineered conveyor system or an individual, portable conveyor unit. Write —

STANDARD CONVEYOR COMPANY
General Offices: North St. Paul, Minnesota
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Write to Dept. FM-121 for valuable reference book "Conveyors by Standard" and tell us what you want to convey.

ROLLER • BELT • SLAT • CHAIN • WHEEL
PUSH-BAR • SECTIONAL
PORTABLE CONVEYOR UNITS:
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VERTICAL LIFTS • PNEUMATIC TUBE SYSTEMS

PLANT HOUSEKEEPING EQUIPMENT

Begins on page 180

touch of a button. It helps protect your plow blade from obstructions on the ground.

This lift is powered by a hydraulic pump attached to the engine fan belt. So there's no battery drain. Since the pump has a clutch, it runs only when power is needed.

National Lift Co., Waukesha, Wis.

■

Rotary Snow Plow

The Snow Jet is a double rotary snow plow. Two 9-in. spiral blades cut a swath 30 inches wide through snow drifts. A rotary fan blows the pulverized snow to either side.

The Snow Jet is powered by a 7.7-hp. gasoline engine, runs on 7½-in. caterpillar tracks. The 6-ft. blower spout can be swiveled to discharge in any direction. By raising or lowering a discharge baffle, you can control the distance that the snow is blown.

Dahlman Equipment Sales Co., 500-502 N. Prior Ave., St. Paul 4, Minn.

■

Vacuum Attachment for Floor Machines

After you are through polishing, steel-wooling, or sanding floors, you usually have a clean-up job on your hands. Not so with the Unico Dry-Vac. For this attachment permits the floor machine to sweep as it polishes.

You use the Dry-Vac on standard Unico floor machines. Maker says it can be installed quickly without special tools. The vacuum draws up dust and fines just as fast as the machine generates them. In addition to housecleaning savings, the Dry-Vac also permits the operator to work in an atmosphere free from dust.

United Floor Machine Co., 7610 S. Greenwood Ave., Chicago 19.

Turn the page

Both "PANORAMS" give BIG VALUE for Your EYE PROTECTION MONEY!

The model numbers and sizes differ (AO 600 for medium and larger faces—AO 800 for smaller faces) but you'll find the same superb wide angle vision, lightweight comfort and conformance to high safety and optical standards in both of these plastic goggles. Worn directly over the eyes or over personal glasses, they protect against flying particles from any direction. For chipping, grinding, babbitting, cutting rivets or rails, riveting, spike driving, spot welding. Your nearest AO Safety Products Representative can supply you.

QUICK FACTS

- Plastic frame and lenses. Cups conform closely to facial contours.
- Smooth face-contacting edges for maximum comfort.
- Many perforations of frame for ample ventilation aud reduction of fogging possibility.
- Bridge is floating saddle type for comfortable fit without pressure.
- Lenses are shatter-resistant acetate. Note swivel rod in center for easy replacement. Clear or green. Green lenses absorb practically all ultraviolet radiations, reduce excessive glare.

American Optical
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

ONLY Gummed tape
SELLS AS IT SAFEGUARDS
YOUR MERCHANDISE
Of all closures, only gummed tape becomes a salesman for you. For just a few cents per roll, the tape is imprinted with your name, trade-mark or message. Your carton is then a traveling advertisement.
Gummed tape provides better protection, too. It discourages pilfering . . . because the thief cannot duplicate your exclusive seal. And its adhesive barrier keeps dust, grime and moisture out of the carton.
Of all closures, only gummed tape displays your message while it protects your merchandise.
Gummed tape . . . first choice among closures
Another blue ribbon company prefers
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SUPERSTANDARD GUMMED TAPE
Graybar Electric Company, Inc., NEW YORK, NEW YORK
"We use imprinted tape because we believe its advertising value greatly exceeds its cost.
"Blue Ribbon gummed tape helps us do our packing easily, quickly and satisfactorily."
Blue Ribbon wins praise like this because it is Supple-ized* . . . adhesive and kraft are specially treated to take out the curl and make Blue Ribbon more flexible and easier to handle.
*Copyrighted
HUDSON PULP & PAPER CORP., Dept. 4-K, 505 Park Ave., New York 22, N. Y.

PLANT HOUSEKEEPING EQUIPMENT

Begins on page 180

High-Pressure Cleaner Uses Plant Steam

This Hypressure Jenny mixes plant steam with water and cleaning solution to produce a powerful spray for washing, sanitizing, or deodorizing. The unit operates on 60 to 150 psi. steam pressure, but can be adapted to higher pressures.

Once electric, water, and steam connections have been made, maker says the Jenny will operate continuously for hours at a time. The unit produces from 45 to 90 gph. of chemical vapor spray.

Plunger-type pump provides positive proportioning of steam, water, and cleaning solution. You can control the steam jet either at the machine or at the cleaning job through a vapor outlet valve. Portable unit is equipped with steel wheels and drawbar.

Homestead Valve Mfg. Co., Hypressure Jenny Div., Coraopolis, Pa.

■

Wet-Dry Vacuum Cleaner

The Johnson Wet-Dry Vac is powered by a 5/7 hp. electric motor. Both motor and collection chamber are enclosed in a heavy gage steel shell. Compact unit is 28 inches high, 16 inches in diameter. It runs on four hard-rubber swivel casters.

You can use this vacuum for wet or dry pickup. It quickly removes water from any type of floor, says the maker. You can also use it to clean overhead pipes and beams, to suck up dirt, chips, and waste from the floor, and to draw soot and ash from boiler tubes and furnace walls.

Standard equipment includes flexible hose, steel cleaning wand, large floor cleaning tool, rubber squeegee, and pull-out-proof rubber cord set.

S. C. Johnson & Son, Inc., Racine, Wis.

Turn the page

Udylite
SELENIUM RECTIFIERS
last longer –
WORK BETTER AT LOWER COST

These new Udylite Selenium Rectifiers are built for top performance at high current densities. They're designed and engineered to give long, efficient service under tough usage. Actual factory-supervised tests prove this fact! A number of selenium stacks were operated continuously for 10,000 hours at the ambient temperature of 35° C at rated loads. Voltage output at the end of this grueling test was *98%* of initial value. In addition, Udylite Selenium Rectifiers offer all of these other outstanding features:

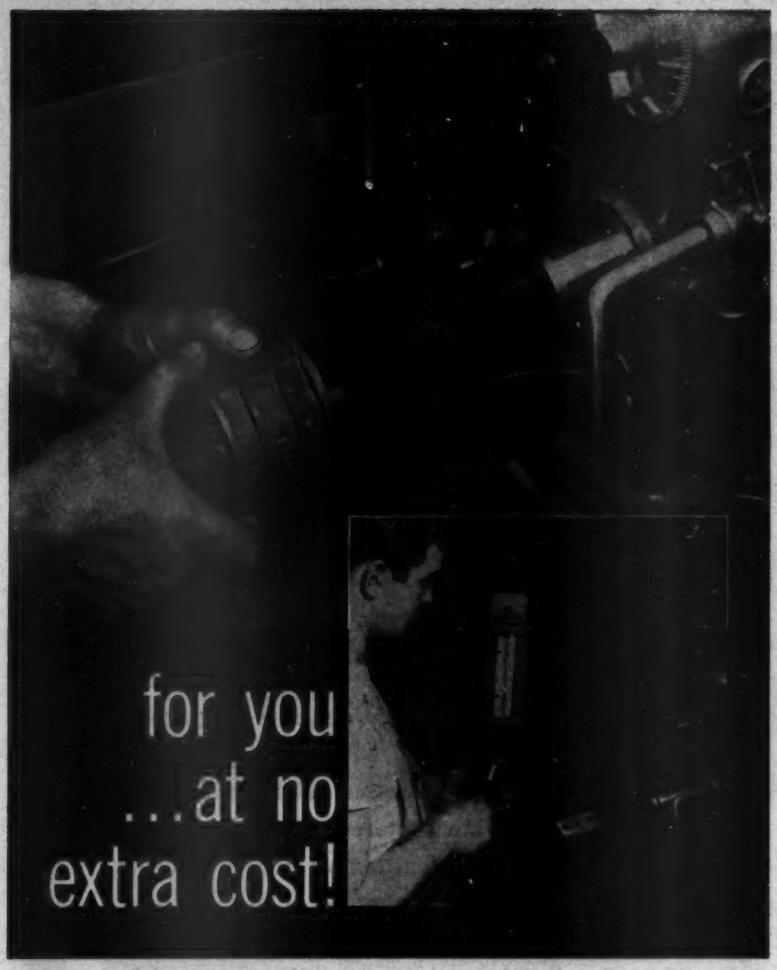
- **Compact, to save space and weight.**
- **Approximately 6,000 sq. in. of rectifying area.**
- **Wide range in combinations of standard sizes.**
- **From a few amperes to thousands of amperes.**
- **Permanent characteristics.**
- **Immune to atmospheric changes.**
- **Adaptable to any type circuit or load.**
- **High efficiency per unit weight.**
- **Economical in cost and operation.**
- **Simple to install and operate.**
- **No moving parts, no maintenance costs.**

Have your nearby Udylite Technical Man give you the complete story about Udylite-Selenium Rectifiers. Or write to *The Udylite Corporation, Detroit 11, Michigan*, for literature describing these units. There's no obligation.

GEARED TO DEFENSE

PIONEER OF A BETTER WAY IN PLATING

THE **Udylite** CORPORATION
DETROIT 11, MICHIGAN



**LONGER TOOL SERVICE LIFE . . .
LOWER TOOL MAINTENANCE COSTS**

Now, on every Buckeye air tool, cylinders are carefully honed to an exacting tolerance of just .0005" to provide greater contact area, insuring longer tool service life and lower tool maintenance costs.

From the 1" diameter cylinders in the compact, powerful Buckeye "A" Series, to the 2¾" cylinders in the husky Buckeye "F" Series, every cylinder is hardened and ground in the customary manner, then honed to mirror smoothness.

This extra production process, typical of Buckeye "Quality First," is just one reason why so many air tool users have found the best buy is Buckeye. If you're still choosing air tools by tradition or habit, better see what you've been missing—try Buckeye in your plant, without obligation.

Buckeye Tools
CORPORATION
DIVISION 13 • DAYTON 1, OHIO

Portable Air and Electric tools for Industry

IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario

SAFETY

Lightweight Welding Goggle

The Unigoggle W-60 is a lightweight safety goggle for gas welding, flame cutting, and brazing operations. Molded plastic frame has large inside ventilated area so goggle can be worn over safety or prescription glasses.

Standard 2x4¼-in. lens is available in Federal Specification shades 3 through 6. Lens is protected by a cover glass, and can be quickly replaced, says maker, without special tools.

Wearer can flip goggle up or down with one hand. Spring, concealed within telescopic arms, holds goggle snugly against face. Head rest, with cork sweatband, can be adjusted to head size.

Jackson Products, Warren, Mich.

■

YOU CAN PROTECT FILES, safes, doorways, or windows with a Dondar electronic switch. The Dondar system sensitizes the objects or areas to be protected. At the approach of a prowler or would-be saboteur, alarm sounds and lights flash on. Dondar Devices, P.O. Box 187, La Canada, Calif.

Turn the page

★ ARCALOY for stainless steel

★ ARMOR-ARC for armor welding

★ BRONZE-ARC for bronze and cast iron

★ WELD-ARC for low hydrogen electrodes

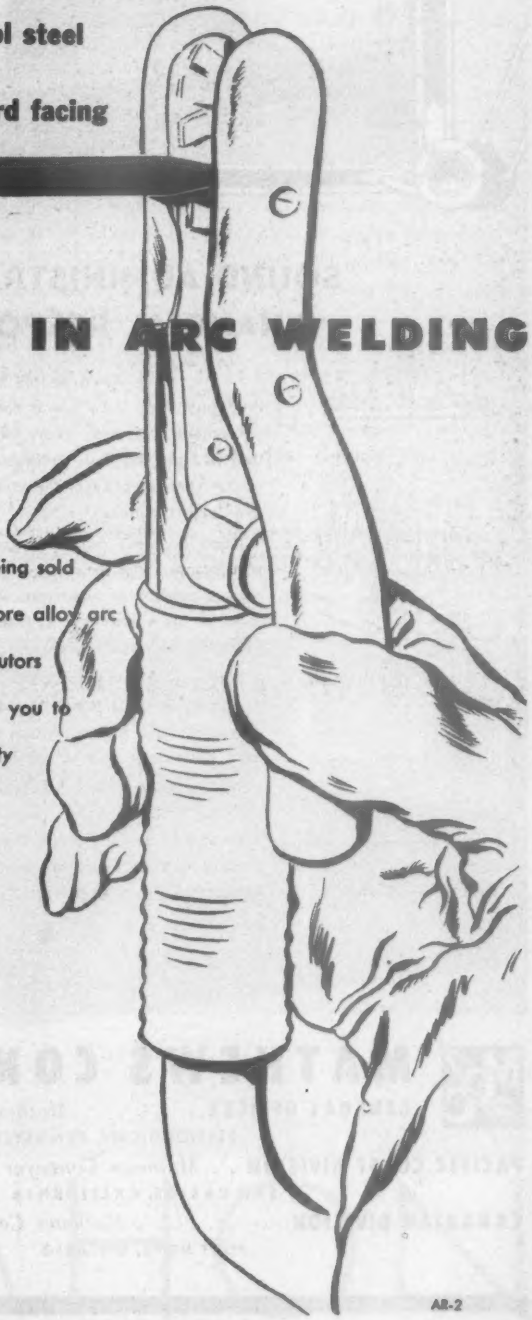
★ NICKEL-ARC for cast iron

★ TOOL-ARC for tool steel

★ WEAR-ARC for hard facing

★

NAMES TO REMEMBER IN ARC WELDING



100% of all *Alloy Rods* production is still being sold through our fine Distributor organization. We are shipping more alloy arc welding electrodes than ever before . . . and while our Distributors may temporarily be out of stock on certain types, we urge you to keep in touch with them on your requirements. After all, *quality* is always worth waiting for.

ALLOY RODS COMPANY

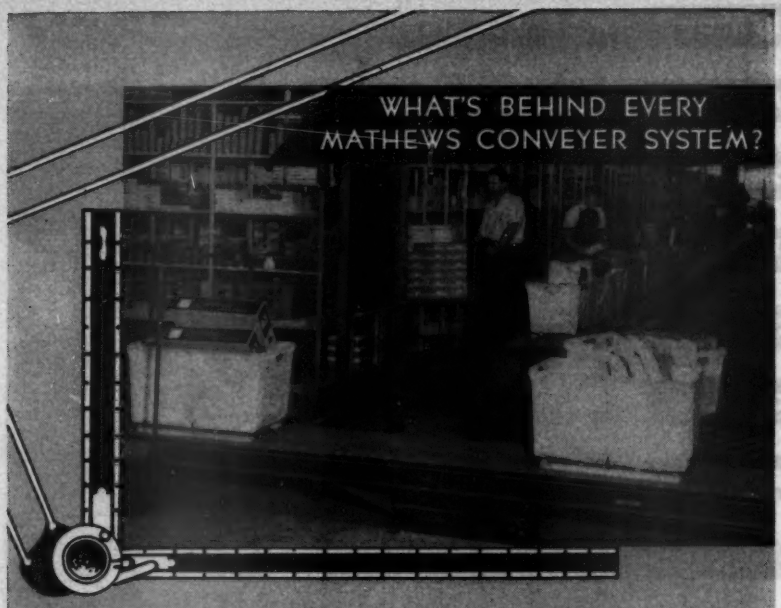
No Finer Electrodes Made . . . Anywhere

YORK, PENNSYLVANIA

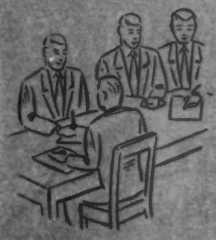
Alloy Rods Co.

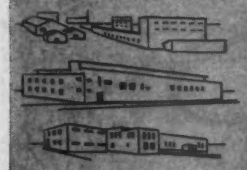
★ *See your nearest Alloy Rods Distributor*

AR-2



SOUND ADMINISTRATION AND FINANCIAL RESPONSIBILITY





● When people buy a conveyer system, they buy more than just a satisfactory installation of equipment. As with every other capital investment, they are placing their confidence in the administrative ability and integrity of the company with which they are doing business.

Good business administration is a guarantee of a satisfactory installation of equipment; and, sound financial responsibility eliminates the risk of being asked to settle for a conveyer system which doesn't perform according to expectations.

Mathews Conveyer Company has, for nearly 50 years, enjoyed the reputation of being reliable and conservative; and, it has always been headed by people who believe and practice sound business methods.

To this strong administration and financial position, add the facilities of three modern plants, a large engineering staff and hundreds of skilled production people. Then you know why we can say, "If it's Mathews Equipment, it has to be right."

●

MATHEWS CONVEYERS

GENERAL OFFICES . . . . . *Mathews Conveyer Company*
ELLWOOD CITY, PENNSYLVANIA

PACIFIC COAST DIVISION . . *Mathews Conveyer Company West Coast*
SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . . . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

Begins on page 136

VALVES, PIPING & ACCESSORIES

Chainwheel Valve Handle With Torque Impactor

With an impactor handle you can close small valves tightly, even when they are located 10 to 50 feet above the floor level. Lugs on the underside of the handle strike simultaneous blows against lugs of an adaptor fastened to the valve stem. The result, says the maker, is a closing force almost three times that of conventional handwheels.

The striking lugs are balanced symmetrically to prevent stem twist and distortion. The impactor handle can be fitted to most standard-size small valves.

Edward Valves, Inc., East Chicago, Ind.

■

AGILENE VALVES are plastic throughout—mostly polyethylene. They come in 1-in. and 2-in. bores, weigh only 1 and 3¼ pounds respectively. In addition to light weight these polyethylene valves are highly resistant to most industrial chemicals. At temperatures up to 170F they'll safely handle hydrofluoric, sulfuric, nitric, and hydrochloric acids, claims American Agile Corp., 5806 Hough Ave., Cleveland 3.

Turn the page

Rolling Steel DOORS

Manually, Mechanically, or Power Operated

Rolling Steel Doors offer the ultimate in space economy, permanence, convenience, and protection against intrusion or fire . . . their vertical roll-up action occupies no usable space inside or outside the opening . . . their quick opening, quick closing operation by means of reliable power operators, controlled from convenient points, saves valuable time. Like most other things, there is a vast difference in the quality of rolling steel doors on the market today—a careful check of specifications will reveal this. For instance, the galvanized steel for the interlocking curtain slats of Mahon Rolling Steel Doors is chemically cleaned, phosphatized and chromated to provide paint bond, and the protective enamel coating is baked on at 350° F. prior to roll-forming. This is just one of the extra value features of Mahon Rolling Steel Doors —you will find others. See Sweet's Files for complete information including Specifications, or write for Catalog No. G-52.

THE R. C. MAHON COMPANY

Detroit 34, Michigan • Chicago 4, Illinois • Representatives in all Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Closing Underwriters' Labeled Rolling Steel Doors and Fire Shutters; Insulated Metal Walls; Steel Deck for Roofs, Partitions, and Permanent Concrete Floor Forms.

ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Five Mahon Power Operated Rolling Steel Doors 22 Ft. x 14 Ft. installed in openings to an enclosed loading dock. These doors are operated by remote push-button controls.

MAHON

Control Costs with TOLEDO

On your scale material becomes money!

PRINTWEIGH STOPS ERRORS . . . Provides printed weight records—at the instant of weighing—assuring that the accurate indication of the Toledo dial will reach your accounting records without chance of human error.

Modern Toledos meet your needs today for *rapid, accurate* scales in all phases of production . . . to help you *control costs!*

These are the scales backed by Toledo's half-century of experience in Research and Engineering that has produced 80% of the major advances in scales during this time.

Toledo engineering has not only specialized in the direct design of weighing machine mechanisms, but also in the many associated fields such as electronics, plastics, metallurgy, optics.

Check your needs *now*—select Toledo equipment for vital jobs in guarding materials and costs! Sales and service in 200 cities. Toledo Scale Company, Toledo 1, Ohio. We will be very glad to send catalogs.

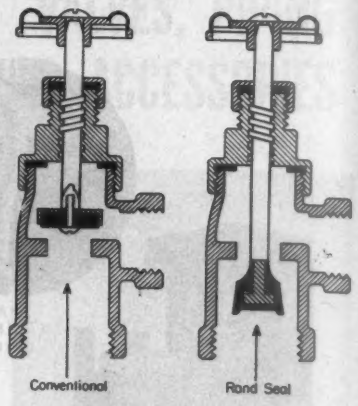
Rapid, Accurate
COUNTING
SCALES
For issuing pre-determined quantities of uniform parts...counting unknown quantities . . . for faster inventory counts . . . or to get accurate receiving, shipping, production, cost and piece-work counts. Selection of models. Send for bulletin 2204

TOLEDO

HEADQUARTERS FOR SCALES

VALVES, PIPING, & ACCESSORIES

Begins on page 188



New Valve Seal

The Rand Seal works with the fluid pressure to provide a leak-proof, long-wearing valve seat, claims its maker. The cone-shaped rubber seal is closed in the same direction as the flow of liquid. In this way the liquid pressure acts to increase the seal, rather than work against it.

Maker says the Rand Seal can be adapted to present design of many valves to control fluid and gas flow.

Rodic Chemical & Rubber Corp., Allen Ave., New Brunswick, N. J.

■

Multi-Purpose Hose

The Mercer people claim that Abrasoflex can reduce your inventory of industrial-type hose. Abrasoflex is an oil- and abrasion-resistant hose designed to handle a wide range of jobs. You can use it with compressed air, water, grease, and gasoline; or in spraying oil or paint.

Abrasoflex rubber hose reinforced with braided rayon will take 250 psi. working pressure. You can get it with black cover in seven sizes, ranging from 3/16 to 1 inch inside diameter.

Mercer Rubber Corp., 66 Reade St., New York.

Turn the page

STEP UP PRODUCTION ...KNOCK DOWN COST

QUAKER V-BELTS

C M P QUAKER

FOR MORE PRODUCTION . . . GET THIS BOOK

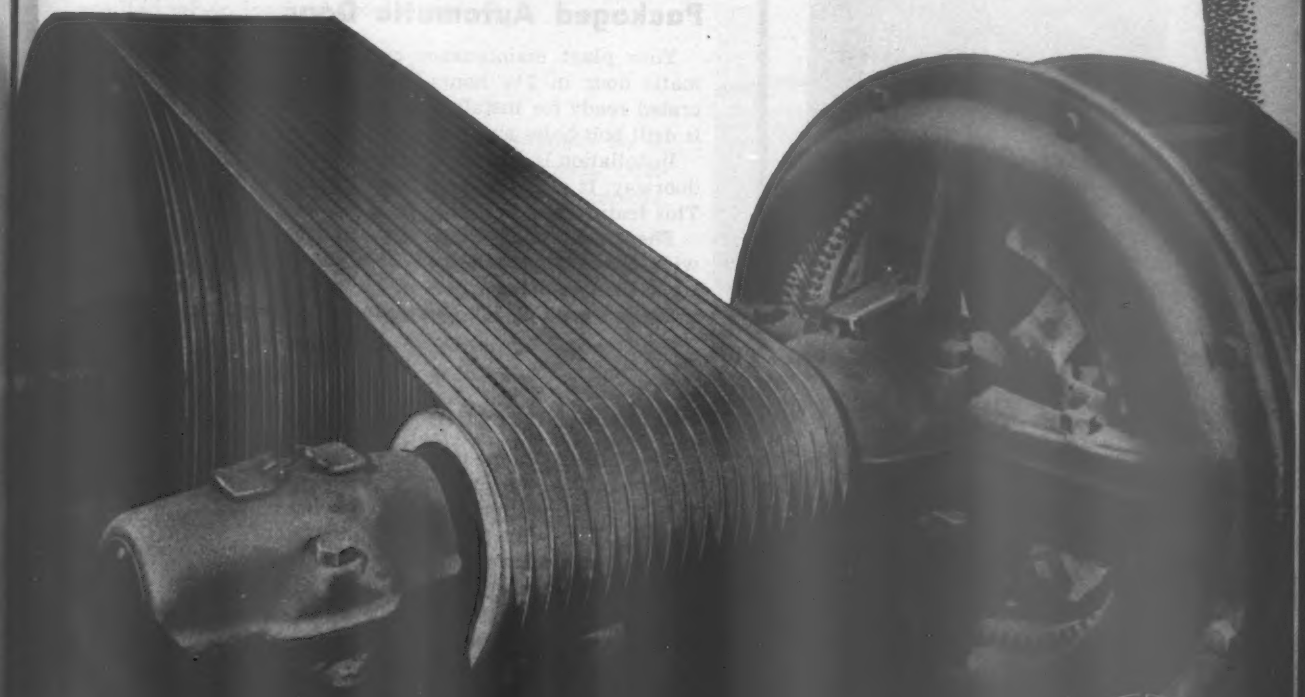
. . . and the entire QUAKER Conservation Maintenance Plan — includes maintenance memos, wall chart, factual data to help you reduce maintenance. No charge . . . no obligation.

Performance-Proved to Give Long Service

For constant high speed production and low maintenance install Quaker V-Belts. They're "service-tested" for long, trouble-free operation . . . run smoothly . . . are easy on the bearings.

The superior performance of Quaker V-Belts stems from a revolutionary construction. They are built of specially compounded materials; sinewed with husky, pre-stretched cord; specially impregnated inside and out to withstand abrasion, acidity and moisture.

Your Quaker representative will be glad to help you select the right industrial rubber product for the job . . . whether it's F.H.P. or multiple V-Belts, flat transmission belts, conveyor belts, hose, packings or moulded products. For full data write for the Quaker catalog.



QUAKER RUBBER CORPORATION

DIVISION OF H. K. PORTER COMPANY, INC.

PHILADELPHIA 24, PENNA. BRANCHES IN PRINCIPAL CITIES

For Action — EC&M LIFTING MAGNETS

ALL OUT!—EC&M Magnet sweeps the car bottom clean—removes all metal that has been paid for.

PICKS UP PRODUCTION—keeps material on the move, and at a low cost per ton handled.

TASK-FORCE—Magnet on Crane-Truck serves all areas in plant quickly—effectively.

Write for No. 29F Accelerator Bulletin

THE ELECTRIC CONTROLLER & MFG. CO.
2698 East 79th St. Cleveland 4, Ohio

MISCELLANEOUS

Packaged Automatic Door

Your plant maintenance crew can set up a Clark automatic door in 2½ hours. The door and its controls come crated ready for installation. All you have to do, says Clark, is drill bolt holes and wire in electrical connections.

Installation is rapid because the door completely covers the doorway. It does not have to be fitted into the door opening. This feature also permits you to use full door width.

The Clark door comes in foldback and sliding models with either approach-pull, floor-plate, or electric-eye controls. Door opens or closes in 3½ seconds.

Clark Door Co., 512 Hunterdon St., Newark 8, N. J.

■

Flexible Intercom System

The Talk-A-Phone people claim their new intercom system is the first in the low-price range with all these features:

- It's designed for systems requiring more than one master station along with additional sub-stations.
- You can answer incoming calls at a distance of 40 feet from any station.
- Master stations may talk with each other.
- Sub-stations may be called selectively or all together.
- Masters may be used privately at the user's option.

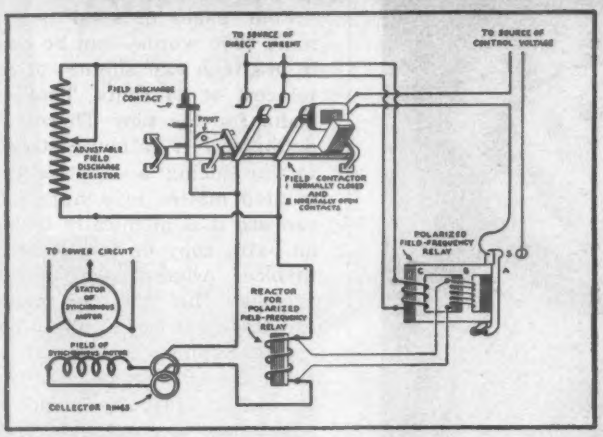
You can get Talk-A-Phones in combination systems of five and ten stations. Master stations are equipped with talk-listen switches, stand-by, station selectors, and volume control. Sub-stations require no manual operation.

Talk-A-Phone, 1 N. LaSalle St., Chicago 2.

Turn the page

EC&M SYNCHRONOUS STARTERS

with Automatic Field Application by Polarized Field-Frequency Relay


TO SOURCE OF DIRECT CURRENT
TO SOURCE OF CONTROL VOLTAGE
FIELD DISCHARGE CONTACT
PIVOT
ADJUSTABLE FIELD DISCHARGE RESISTOR
FIELD CONTACTOR 1 NORMALLY CLOSED AND 2 NORMALLY OPEN CONTACTS
POLARIZED FIELD-FREQUENCY RELAY
TO POWER CIRCUIT
STATOR OF SYNCHRONOUS MOTOR
REACTOR FOR POLARIZED FIELD-FREQUENCY RELAY
FIELD OF SYNCHRONOUS MOTOR
COLLECTOR RINGS

Push Button Start **brings motor up to speed automatically. Motor pulls into step *without delay.* Automatic Field Removal if motor slows down on voltage dips or overload. Field automatically re-applied when load re-accelerates.**

★★★

With greater skill than human hands could do it, EC&M Push Button Magnetic Starters provide completely automatic operation of synchronous motors.

At about 95% synchronous speed, the motor is pulled into synchronism. Full Field excitation occurs when the rotor and stator poles are most favorable to locking into synchronism. This causes synchronization to occur without pole slippage, with minimum line current and greatest synchronizing torque.

EC&M Synchronous Starters are built for both low and high voltages up to 4600 volts. They are of unit construction with all internal wiring complete. The cubicle types are totally enclosed and do not require an expensive control room. They may be mounted alongside the motors they control.

Write for No. 21 ACCELERATOR and Bulletins 1075, 1076, 1077 and 1078

440 Volt EC&M Enclosed Synchronous Starter

2300 Volt EC&M VALIMITOR Starter for Steel Mill Air Compressor

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Let us try to help you . . . Sometimes we can relieve the pressure of customer's demands by suggesting alternate material or production changes which will help you get more use from the steel you use. Whatever your steel problem may be, why not put it up to United States Steel Supply?

UNITED STATES STEEL SUPPLY COMPANY

Warehouses Coast to Coast

USS

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PITTSBURGH · PORTLAND, ORE. · ST. LOUIS · TWIN CITY (ST. PAUL) · SAN FRANCISCO · SEATTLE
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Headquarters Offices: 208 S. La Salle St.—Chicago 4, Ill.

UNITED STATES STEEL

MISCELLANEOUS EQUIPMENT

Begins on page 192

Low-Cost Duplicator Makes Copies Fast

Four pages of solid typing—some 2000 words—can be copied in less than two minutes at a total cost of 24 cents. That's the claim for the new Thermo-Fax duplicator. It's a low-cost device for producing a few copies of printed matter in a hurry. You can use it economically to make an extra copy or two of letters, invoices, printed pages or pencil sketches. But it is not intended for copying in large quantities.

The duplicator is about one-third the size of an office desk. It runs on 110-volt a-c, does not require a skilled operator. There's no need for dark room, negatives, or developing. Operator just slips the page to be copied together with a sheet of Thermo-Fax into the machine. Then closes the cover and pushes a button. Ten seconds later the copy is finished.

Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

■

A NEW FLOOR MARKER will line safety and parking lanes within ⅛ inch of walls, machines, other obstructions. The Florline is a gravity-feed brush-type aisle liner. You can push it along with one hand at walking speed. It's the only marker with a trigger control for lifting the brush from the floor, claims the H. C. Sweet Co., 12083 Woodbine Ave., Detroit 28.

A SWINGING RUBBER DOOR will open at a touch and easily absorb the shock of industrial trucks, claims the Stic-Klip Mfg. Co., 50 Regent St., Cambridge, Mass. The Stic-Klip door is built up of inflated rubber bladders. It has high insulation value, weighs about 1/3 as much as conventional doors.

Turn to page 329

Cash in your Scrap!

"Mopping up" for momma

If your wife has one of the popular, new O'Cedar Cellulose Sponge Mops, take a good look at it. You will note that the cellulose sponge is bonded to a piece of canvas, which in turn is bonded to a metal plate. In each case, a 3M adhesive is used.

Working closely with O'Cedar engineers, 3M developed an adhesive specifically for their application. The adhesive had to be highly resistant to soaps and detergents, boiling water, and plain, old-fashioned "elbow grease." Moreover, the adhesive had to fit production line methods that turn out thousands of high quality mops, at low cost. The success of this adhesive—proved by manufacturer and consumer—is another tribute to the almost limitless versatility of 3M adhesives.

Scientifically engineered to each job, 3M adhesives, coatings and sealers are cutting costs, speeding production and improving products daily . . . in all industries!

See what adhesives can do for you . . .

Contact your 3M salesman. His expert advice is at your disposal. And for more information on adhesives, coatings and sealers, write 3M, Dept. 312, 411 Piquette Avenue, Detroit 2.

3M COMPANY

OVER 1,000 BASIC

ADHESIVES • COATINGS • SEALERS

ADHESIVES AND COATINGS DIVISION • MINNESOTA MINING AND MANUFACTURING COMPANY
411 PIQUETTE AVE., DETROIT 2, MICH.
GENERAL OFFICES: ST. PAUL 6, MINN.
EXPORT AND CANADIAN SALES: 270 PARK AVE., NEW YORK 17, N. Y.

THIS G-E CLEANER

Helps you *Save Money*

Helps you *Save Time*

THESE modern, G-E Heavy-duty Cleaners have many special features:

- They help you cut cleaning time . . . a sure way to cut maintenance costs.
- They switch quickly and easily from wet to dry pickup . . . powerful motors pick up mop water, dust, coarse litter with equal ease.
- They have extra-wide nozzles to cut the cleaning time of larger areas.
- They convert in a moment to *powerful blowers* for quick gathering of scrap into convenient piles for salvage or disposal.
- They have special attachments for cleaning high, hard-to-reach areas thoroughly and quickly.

These are but a few of the features that make G-E industrial cleaning equipment so productive.

MAIL COUPON FOR DETAILS

Heavy-Duty Cleaning Equipment

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, Dept. 22-1328
1285 Boston Ave., Bridgeport 2, Conn.

Without obligation, please send complete details on heavy-duty cleaning equipment.

NAME .....

FIRM .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

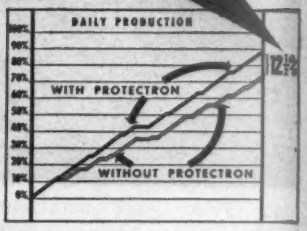
PROTECTRON

paid for itself

in two months by

INCREASING OUTPUT

12½%



JAMES G. SCHNELL, *President of The Brinnell Company—nationally known authorities on "Preventive Maintenance" and production efficiency.*

If you could increase the output of each machine in your plant an hour a day without increasing overhead, what would it mean to you in dollars and cents?

Protectron guarantees that extra production hour by monitoring automatic machines through coffee and smoke "breaks" . . . even lunch periods and while operators procure and ready new stock. You get nine hours worth of production from every eight hour shift.

That's at least 12½% more output from every Protectron equipped machine, and some plants report increases up to 22%.

REDUCES tool and die BREAKAGE up to 86%

Protectron senses any increase in mechanical overload caused by pile-ups, misfeeds, overhard or oversize stock . . . and automatically stops machines before trouble occurs . . . reducing tool and die breakage by as much as 86%—and virtually eliminating down time.

PERMITS 1 MAN to operate 4 MACHINES

In addition, Protectron's vigilant, automatic protection enables one man to safely and efficiently operate four machines . . . thus releasing three men for other work.

Let our field engineers show you how Protectron can add an extra hour to your working day while it also cuts damage costs and saves manpower.

The Brinnell Company
SIMSBURY, CONN.

The 3 of Us Make a Great Team!

Me — THE DESIGNER

My Boston Gear Catalog containing complete information on

101 GEAR GROUPS . . . 4704 STOCK GEAR ITEMS

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WALLINGFORD, CONNECTICUT
WATERBURY, CONNECTICUT
WILKES-BARRE, PENNSYLVANIA
WINSTON-SALEM, NORTH CAROLINA
WORCESTER, MASSACHUSETTS

TO THIS BASIC STARTER UNIT can be added a choice of selector switch or push-button stations, auxiliary contacts, transformers and extra overload relays.

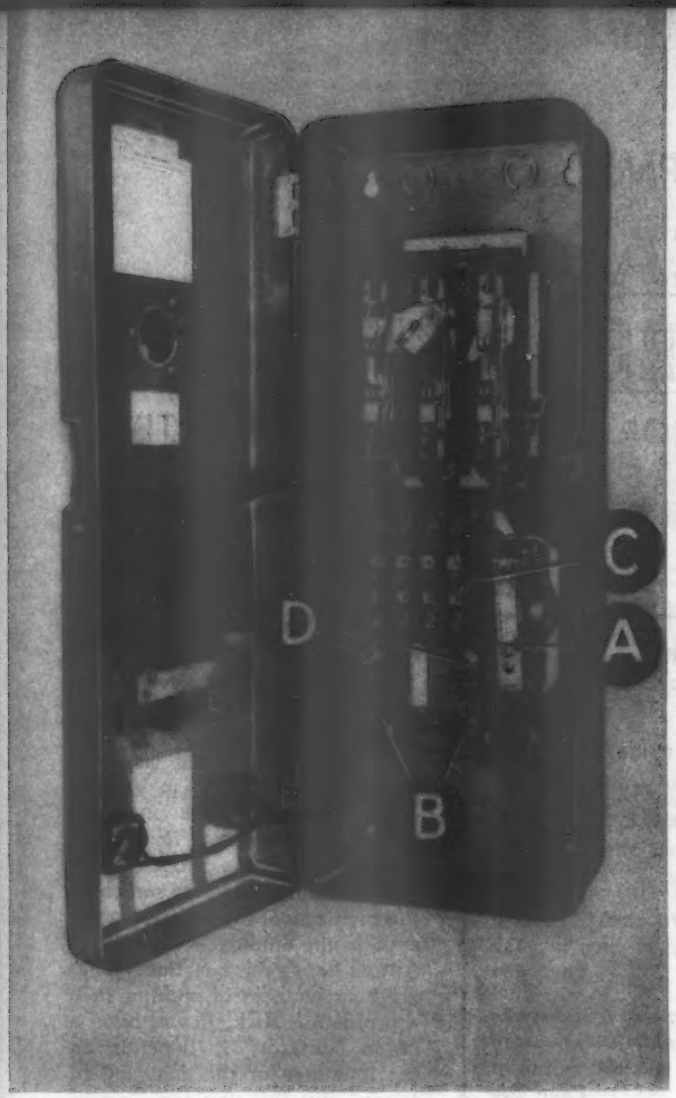
NEW LINE OF MOTOR CONTROL WITH PACKAGED ACCESSORIES

This magnetic starter unit is complete in itself, yet it's built to take on—in the field—additional control accessories.

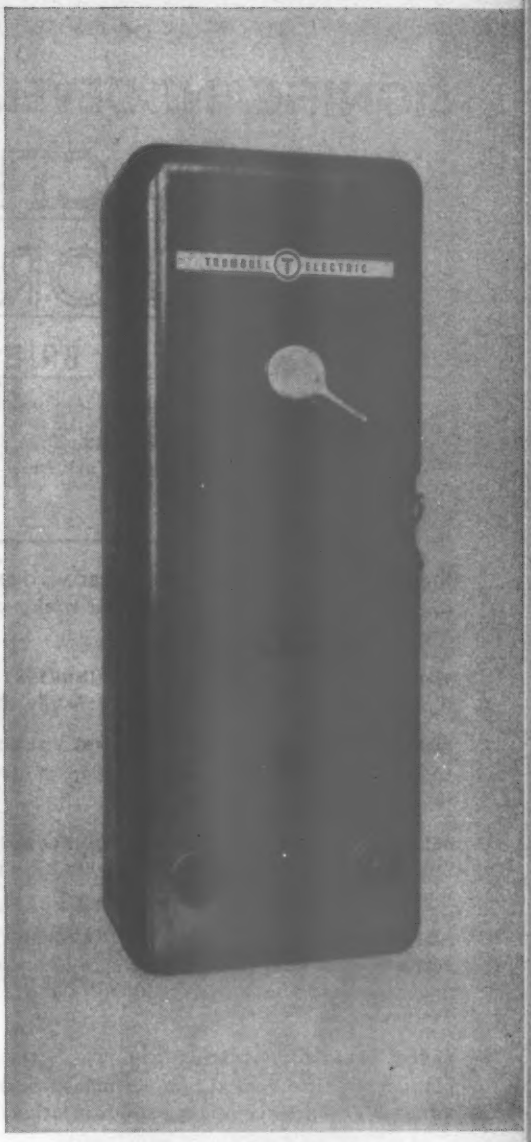
This latest Trumbull development—identified as HM motor controls—permits adding on to the basic starter unit such accessories as extra overload relays, auxiliary switches, selector switches, push-button stations, transformers, coils, etc.

Inventories, obviously, can be reduced. Fewer units can be made suitable for more jobs merely by installing the proper accessories in the field.

For full information on Trumbull's HM line of controls—sizes 0 through 3 for 110-600 volt service, fractional through 50 hp—address TRUMBULL ELECTRIC, Department of General Electric Company, Plainville, Connecticut, and ask for TEB-8.



THE SAME MAGNETIC STARTER also comes combined in one enclosure with Trumbull's HCI (High Capacity Interrupter) or a circuit breaker disconnect. Note Trumbull's (A) time-proved clapper-type controller. Its self-aligning, shock-absorbing armature assembly protects coil, prevents chatter, prolongs contactor life . . . (B) new sensitive control circuit—trips only for dangerous overload or undervoltage conditions . . . (C) high-hardness, double-break contacts that are self-wiping and installed in dust-free vertical position, which also permits easy servicing and straight-through wiring . . . (D) overload relay shift lever that moves easily from one slot to another for quick change from manual to automatic reset.



THIS TRIM-LINED ENCLOSURE combines a magnetic starter with circuit breaker disconnect and provides mounting space for all the various accessories. Note provision for padlocking. Easy to wire because complete interior can be removed simply by loosening the screws.

TRUMBULL ELECTRIC

DEPARTMENT OF GENERAL ELECTRIC COMPANY
PLAINVILLE, CONNECTICUT

SIGNIFICANT DEVELOPMENTS IN PRACTICAL LABOR RELATIONS

TOLD IN BRIEF FOR BUSY FACTORY EXECUTIVES

By **PAUL A. KING**, *Bigelow-Sanford Carpet Company, Inc.*
Member, New York Bar.

HIGH SCHOOL DIPLOMA NOT A PROMOTION TEST. *Just pointing to a diploma won't get you around tricky promotion-by-seniority clauses* ..... **Page 200**

WHAT IS "PREVAILING AREA OR INDUSTRY PRACTICE?" *Here are WSB instructions to its regional people* ..... **Page 202**

EMPLOYER ASSOCIATION'S ECONOMIC LOCKOUT LEGAL. *This seems to be contrary to the general trend of decisions, but there is a reason* ..... **Page 204**

DELAY IN FILING MAY FORFEIT SOCIAL SECURITY. *Delay cost a worker's widow six years of benefits. Don't let it happen in your plant* ..... **Page 204**

HOW AN "ECONOMIC STRIKE" CAN BACKFIRE. *If an economic strike turns into an unfair practices strike because of something you say or do, you may have to take strikers back. That was the ruling in Tennessee* ..... **Page 206**

LABOR RELATIONS IS YOUR JOB. *This case clearly shows that the plant executive—not the home office—carries the big burden of administering the company's labor relations policy* ..... **Page 206**

WHAT ABOUT FIRING A WORKER FOR NON-PAYMENT OF DUES? *The question is: Can you take the union's word that an employee is being kicked out for non-payment of dues and not for some other reason?* ..... **Page 208**

ADD SAFETY TO PROMOTION QUALIFICATIONS. *Here is another qualification to consider in promoting under an ability-seniority promotion clause* ..... **Page 208**

WATCH UNEMPLOYMENT TAXES IF EMPLOYEES WORK IN SEVERAL STATES. *Here is an outline of some of the things to consider in determining whether or not you have an unemployment tax problem* ..... **Page 210**

DISCHARGE OF NUMBERS SALESMAN UPHELD. *You would think that there would be little doubt about this question, but a union took one company to arbitration on it* ..... **Page 210**

BRIEF—BUT IMPORTANT. *Wage surveys . . . WSB negotiation policy . . . Group insurance for unions . . . Physical examinations for employees . . . Cash payments for insurance . . .* **Page 212**

High School Diploma Not a Promotion Test

Assume you're considering two employees for promotion to a certain job. One is a high school graduate; the other is not. They're about equal in experience. You can't quite put your finger on the reason for it, but you promote the high school graduate. You feel that somehow the high school diploma gives the edge to the employee who has it.

Now here's the question: What are your chances of making such a promotion stick, if you have a union contract? It depends on the language of the contract, of course. But this you can be sure of: Your chances aren't very good if the contract puts much emphasis on seniority as the basis for promotion.

Here's a case in point: The contract said the senior employee could be passed over in favor of a junior only if the senior didn't have the ability to do the job, experience in it, and knowledge of the job's duties. A junior employee—a high school graduate—got the nod over a non-graduate senior employee.

The arbitrator ruled that the company couldn't use lack of high school diploma as a reason for ignoring seniority.

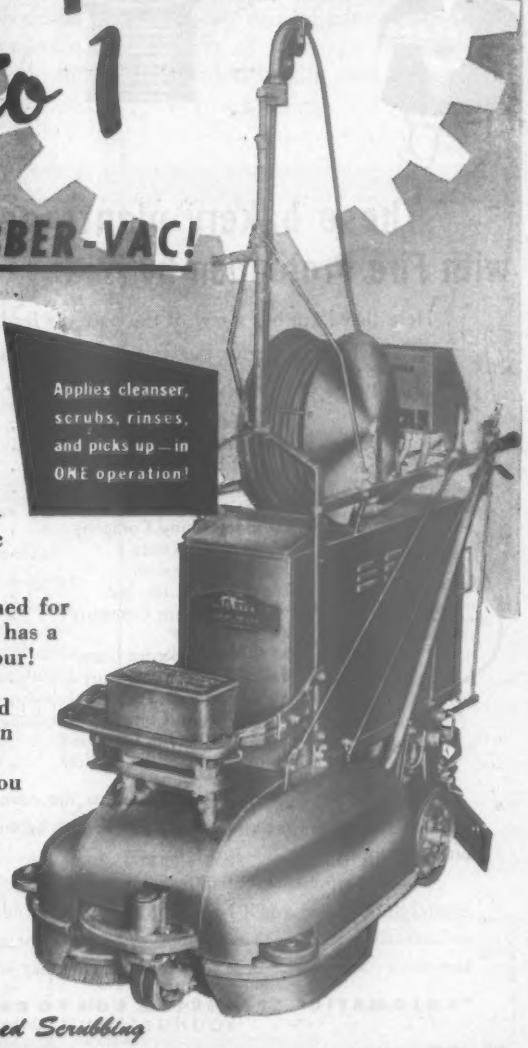
If education is an important factor in making your promotions, better make a try to write it into your next contract. (*Union Oil Co. of Calif. Award*)

Turn the page

MECHANIZE 4 Scrubbing Operations into 1

with a COMBINATION SCRUBBER-VAC!

Here's a timely answer to the need for conserving manpower and reducing labor costs—*a single cleaning unit that completely mechanizes scrubbing.* A *Combination Scrubber-Vac* applies the cleanser, scrubs, rinses if required, and picks up (damp-dries the floor)—*all in one operation!* Maintenance men like this *four-in-one feature;* also the fact that the machine is *self-propelled* . . . has a *positive* clutch . . . new type of water valve that *assures* uniform flow of water . . . and powerful (quiet) vac for efficient pick-up.



The *Scrubber-Vac* shown at right, *Model 213P,* is designed for heavy duty scrubbing of large-area floors. This machine has a 26-inch brush spread, and cleans up to 8,750 sq. ft. per hour! (Powder dispenser is optional.) *Finnell* makes *Scrubber-Vac Machines* in a full range of sizes—for small, vast, and intermediate operations. From this complete line, you can choose the size that's exactly right for *your* job (no need to *over-buy* or *under-buy*). It's also good to know that you can lease or purchase a *Scrubber-Vac,* and that *there's a Finnell man nearby* to help train your maintenance operators in the proper use of the machine and to make periodic check-ups.

For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 2512 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

Conserve Manpower with Completely Mechanized Scrubbing

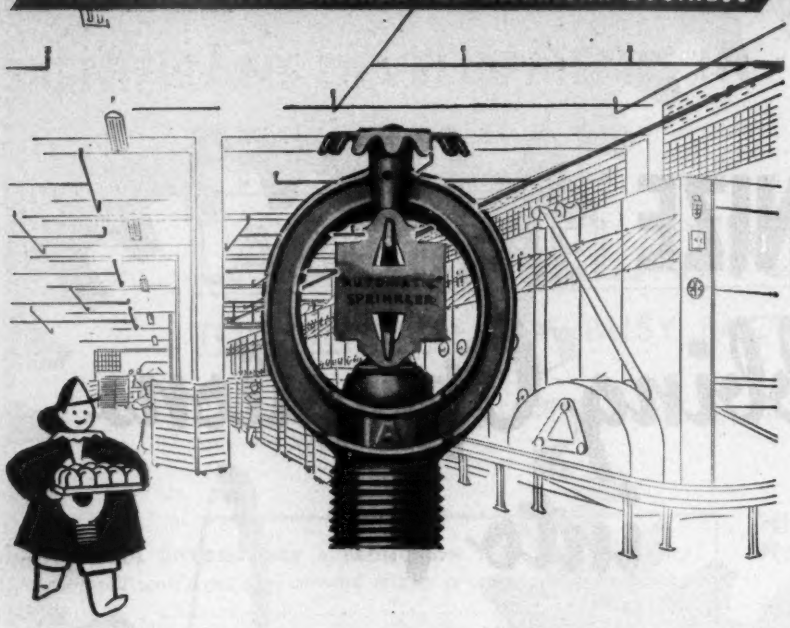
FINNELL SYSTEM, INC.

Originators of Power Scrubbing and Polishing Machines

Everything for Floor Care — FINNELL

BRANCHES IN ALL PRINCIPAL CITIES

FIRE SAFETY WITH SAVINGS FOR AMERICAN BUSINESS



These bakery plants get safety-plus, with Fire Protection by "Automatic" Sprinkler

Here listed are but a few of the nation's leading bakery products manufacturers who are safeguarding lives, property and—saving money, through the investment of absolute "Automatic" Sprinkler fire protection:

American Stores Company	.	Philadelphia, Pa.
Burny Brothers, Inc.	.	Chicago, Ill.
Capital Bakeries, Inc.	.	Pottsville, Pa.
George E. Drake Baking Co.	.	Pittsburgh, Pa.
Finney's Holsum Bakery	.	Greenville, Texas
Gordon Baking Company	.	Detroit, Mich.
Hathaway Bakeries	.	Syracuse, N. Y.
Hathaway Bakeries	.	Boston, Mass.
Holsum Bakeries, Inc.	.	Tampa, Fla,
Johnson Biscuit Company	.	Sioux City, Iowa
Kern's Bakery	.	Knoxville, Tenn.
McGough Bakeries Corp.	.	Birmingham, Ala.
Pacific Cracker Company	.	Los Angeles, Calif.
Purity Bakeries, Inc.	.	Kansas City, Mo.
Purity Baking Company	.	Rockford, Ill.
Schwebel Baking Company	.	Youngstown, Ohio
United Cooperative Society	.	Fitchburg, Mass.

Consult the classified section of your telephone directory for our nearest representative, or call or wire us collect.

Adequate fire protection is essential to the economic operation of any food products plant and—the same is true for all types of industrial, commercial and institutional properties.

Our field representative will be happy to prepare a fire protection analysis for your consideration. Then, you'll be able to see at first hand, why "Automatic" Sprinklers are universally recognized as an important investment today . . . welcomed protection tomorrow—next week—next year—or whenever they are needed.

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

"Automatic" Sprinkler
FIRST IN FIRE PROTECTION
DEVELOPMENT . ENGINEERING MANUFACTURE . INSTALLATION
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

PRACTICAL LABOR RELATIONS

Begins on page 200

What Is "Prevailing Area or Industry Practice"?

It wasn't too long ago that the Wage Stabilization Board said it would act on petitions for approval of "fringe" benefits "which do not exceed prevailing industry or area practice either as to amount or type." This was part of General Regulation B.

But then these questions came up: What *is* prevailing industry or area practice? And which is appropriate in any given case—industry or area?

The WSB's answer doesn't make things too clear. It boils down to this: The Board is going to use a lot of judgment in deciding what's appropriate in each case. The standard for comparison, says the Board, will be: "that grouping of establishments most appropriate to the preservation of historical, traditional, or otherwise normal patterns of adjustment."

The size of the area for area practices comparisons is also left open. It may be "within a particular local area, or in a geographic section, or nationwide, as the Board deems most appropriate. . . . But," says WSB, "the standard of area practice will normally be used as the standard of comparison for the requested adjustments."

Similarly, "Industry practice means a substantially uniform practice followed by a number of establishments in an industry operating in a particular area, or in a geographic section, or nationwide."

In answer to the tough question of whether industry and area comparisons are mutually exclusive, the Board says this: "As a general rule, a prior Board determination of 'industry practice'

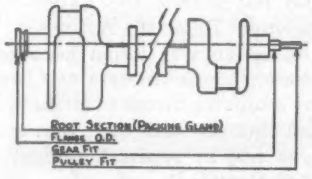
Salvage of rejects speeded by new metallizing alloy

outwears old bearing material 25 times

Automotive manufacturer replaces chrome plating installation with metallizing for salvage of mis-machined crankshafts; steps up output to 10 per hour

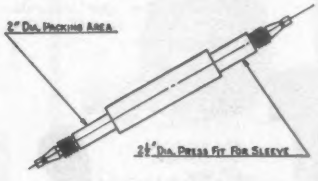
Sprabond Wire, the new self-bonding metallizing alloy, is speeding reject salvage in a wide range of production applications. It has been found particularly valuable in building up parts which have been machined undersize, or damaged by tool marks. Resulting surfaces are extremely hard and, due to their microscopic pore structure, tend to hold considerable amounts of oil. These factors produce excellent wear characteristics, some users reporting increases in service life as much as 25 times that obtained in any other way.

Application is simple and fast; only 3 operations: (1) the part is cleaned or undercut; (2) Sprabond Wire applied; (3) the surface finish-ground. Dovetailing and undercutting often not required and build-up can be carried to a feather edge. No danger of warpage because negligible heat is generated in the part during spraying.



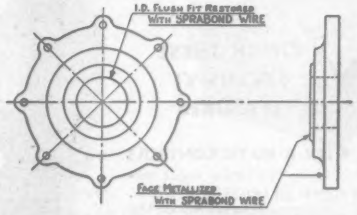
Better and faster than plating

Sketch shows automotive crankshaft of the type being reclaimed in quantity by large manufacturer. These parts were formerly reclaimed by plating, which was slow and expensive. With metallizing, however, production rate is 10 shafts per hour.



Where welding is impractical

Heat warping and consequent straightening costs made welding impractical for salvage of blower shafts such as shown above. Shafts formerly scrapped and replaced are now rebuilt. With Sprabond Wire metallizing, saving is $45.00 each.

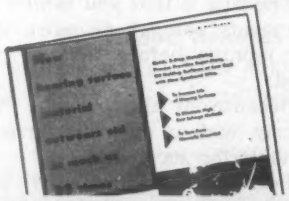


Fits restored—no re-machining

Press fit in electric motor end bell is frequently lost through wear. Welding is impractical here, too, because of warpage. But a few thousandths of Sprabond Wire on the I.D. builds a press fit so that even minimum grinding is often unnecessary. Savings per end bell—about $30.00.

Some other money-saving applications for the Sprabond Wire process

Cracked blocks and castings—flat surfaces—molds, patterns, match plates—sand holes thin sections—lathe ways—inside diameters—gas holes.



FREE BULLETIN Metco Bulletin 57B describes the advantages of the Sprabond Wire metallizing process in detail. Micro-photograph of Sprabond Wire coating on steel shows how it works. Use the coupon to send for your free copy today. No obligation, of course.

The following trade names are the property of Metallizing Engineering Co., Inc.: METCO*, SPRABOND WIRE. *Reg. U. S. Pat. Off.

R. J. McWaters
Metallizing Engineering Co., Inc.
38-16 30th St., Long Island City 1, New York

Please send me Bulletin 57B.

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In Great Britain: METALLIZING EQUIPMENT COMPANY LTD. Chobham near Woking, England

Now Available...the NEW
MOBILIFT
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Lev-R-Matic DRIVE
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Created to meet a demand!
...This is the Stand-Up Model "H-W" that MOBILIFT engineers developed to meet specific needs in all types of industry to help speed production and cut handling costs!
Not a single maneuverability feature or MOBILIFT advantage found in smaller models has been sacrificed in this new versatile "H-W" 3,500-lb. or "H" 3,000-lb. capacity truck.

CHECK THESE EXCLUSIVE FEATURES

- LEV-R-MATIC CONTROLS
  2-way PUSH-PULL levers perform all jobs—Forward-Back, Elevating, Tilting. NO GEARS TO SHIFT
- MOBIL-CHAIN LIFT
  Roller chain operated uprights allow unobstructed forward view.
- MOBILIFT AIR COOLED 3-CYLINDER ENGINE
  This heavy duty engine was designed and manufactured for exclusive use in MOBILIFT Fork Lift Trucks.

Stand-Up Model "H-W"
3,500-lb. cap. on 15" load center. Mast ht. 83" (Free Lift 56"; lift ht. 108"; mast ht. extended 136"). Outside turning radius 63⅞"; inside turning radius ZERO.

Illustrated:
Model "H-W" with 83" Mast.
Also available with Standard 63" Mast.
Model "H" 3,000-lb. cap. available with 63" and 83" Masts.

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2730 San Pablo Ave., BERKELEY

PRACTICAL LABOR RELATIONS

Begins on page 200

will not be affected by any adjustments subsequently approved on the basis of 'area practice'; likewise, a prior Board determination of 'area practice' will not be affected by any adjustments subsequently approved on the basis of industry practice."

Employer Association's Economic Lockout Legal

The National Labor Relations Board unanimously ruled that a shutdown of operations by members of an employers' association did not violate the Labor-Management Relations Act when: (1) the action was taken because of the economic uncertainty caused by a union's threat to strike without notice, and (2) the action was not in reprisal against the strike action.

The ruling was made in an unfair labor practice case filed by Local 254, International Association of Machinists (AFL), against 19 new car dealers, Des Moines, Iowa. The 19 were among 21 dealers negotiating with the union through the Des Moines Automobile Dealers Association.

Delay in Filing May Forfeit Social Security

Retired employees who do not file promptly for Social Security may lose some of their benefits. This also applies to widows.

The rule is that you cannot get payments going back more than six months before the day you filed.

Because of this rule, a New Jersey widow recently forfeited benefits for six years.

Personnel departments! Post retiring employees (and widows) on this rule.

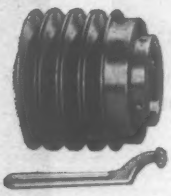
Turn the page

BIG or Small

...EVERYTHING IN V-BELT DRIVES!

NON-STOCK SHEAVES — These sheaves are made to order from stock patterns for A, B, C, D, or E belts, 1 to 1000 hp. For further information check with your *Texrope* drive dealer or Allis-Chalmers Sales Office.

***SUPER-7* V-BELT** — Famous grommet construction. No splices where failure can start. Rubber cushion supports rayon cord at pitch line. Sizes and sections to suit all operating conditions. All Standard sizes from stock.



***VARI-PITCH* STANDARD SHEAVE** — Speed range of 9% to 28% on drives of 1 to 300 horsepower, using A, B, C, D, or E belts. Two to 10 grooves. These sheaves are available in either motion control or stationary control.

AUTOMATIC *VARI-PITCH* SHEAVES — Offer stepless speed control . . . one to 40 hp . . . 2 to 1 speed range. Move motor forward to increase speed, and back to decrease. One hand does it while motor is running.

***MAGIC-GRIP* SHEAVES**— Fastest mounting sheave you can buy. Aligns easily . . . cannot shake loose. 1 to 12 grooves for A-B, B, C, and D belts. 1 to 250 hp. Stocked in many cities for immediate delivery.

***TEXSTEEL* SHEAVES** — Pressed steel sheaves for applications from ¼ to 25 horsepower. Light weight and rigid. 1 to 6 grooves, A or B belts. All sizes and bores are available for delivery from stock.

***VARI-PITCH* SPEED CHANGER**—Smooth, accurate speed control at turn of hand wheel. Machines operate at exactly the speed for best production. Stepless speed range: 3¾ to 1. Capacity: 1½ to 75 hp.

YOU CAN GET every V-belt drive component from the *Texrope* line: Constant speed drives; standard and wide range *Vari-Pitch* drives; speed changers; motor bases; and new or replacement long lasting *Super-7* V-belts.

Get Added Benefits

In addition, you get extra engineering skill both in the field and factory that comes from having more industrial V-belt installations than any other manufacturer.

The world's greatest store of V-belt engineering knowledge has been condensed into a 120 page *Texrope* Pre-Engineered Drive Book. Covers 90% of all V-belt drive requirements. Ask your Allis-Chalmers Authorized Dealer or Sales Office for Bulletin 6956A, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3272

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MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

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"THE *MASTER* OF *FLAME*"

FIRST..

in advanced engineering design and functional dependability . . .

FIRST..

in fire-stopping effectiveness with inexperienced operators . . .

MODEL 20-B

. . . . . Your BEST PROTECTION FOR FLAMMABLE LIQUID, GAS AND ELECTRICAL FIRES

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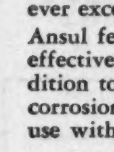
DRY CHEMICAL
FIRE EXTINGUISHING EQUIPMENT

Ansul Dry Chemical Fire Extinguishers were FIRST with the GREATEST FIRE-KILLING RATINGS ever attained by hand and wheeled portable fire extinguishers*. No type or make of extinguisher has ever exceeded Ansul's effectiveness ratings for flammable liquid fires.

Ansul features include: 1) Patented nozzle which provides the most effective stream pattern for quick extinguishment of fires . . . in addition to forming a heat-shield for the operator. 2) Water-tight and corrosion-resistant construction. 3) Easy, on-the-spot recharging after use without special tools . . . and many others.

● Ansul Chemical Company is the *only* fire extinguisher manufacturer maintaining extensive chemical research laboratories in addition to a large engineering staff for research and development to maintain and improve the quality of its products . . . *Plus* the most extensive, best-equipped proving grounds in the industry.

Ansul *"PLUS-FIFTY"*® Dry Chemical is non-corrosive, non-abrasive and non-toxic. It is safe to use on electrical fires of any voltage. And ANSUL extinguishers need only be inspected annually, NOT RECHARGED, adding ECONOMY to GREATER FIRE-STOPPING EFFECTIVENESS.



*Get the facts. See comparative effectiveness ratings for various types of approved fire extinguishers based on tests by nationally recognized approval agencies. Write for file No. 802. You will receive complete information and other valuable data.

ANSUL CHEMICAL COMPANY
Fire Extinguisher Division
MARINETTE • WISCONSIN

OFFICES AND DISTRIBUTORS IN PRINCIPAL CITIES IN THE U. S. A., CANADA AND OTHER COUNTRIES
ALSO MANUFACTURERS OF INDUSTRIAL CHEMICALS, REFRIGERANTS AND REFRIGERATION PRODUCTS

PRACTICAL LABOR RELATIONS

Begins on page 200

How an "Economic Strike" Can Backfire

The law is clear that you don't have to take back employees who go out on an economic strike (for example, for more money or fewer hours). But if you aren't careful, you may do or say the wrong thing, and have to take them back.

The law says that employees who are out on a strike over an unfair labor practice — within limitations — have to be taken back. What you have to watch for is that a strike that starts out as an economic strike doesn't end up as an unfair labor practice strike.

That's just what happened to the DeSoto Hardwood Flooring people in Tennessee. Here's what DeSoto did:

- withdrew recognition of the union as statutory representative of its employees;
- refused to bargain thereafter;
- increased wages without bargaining with the union.

Labor Relations Is *Your* Job

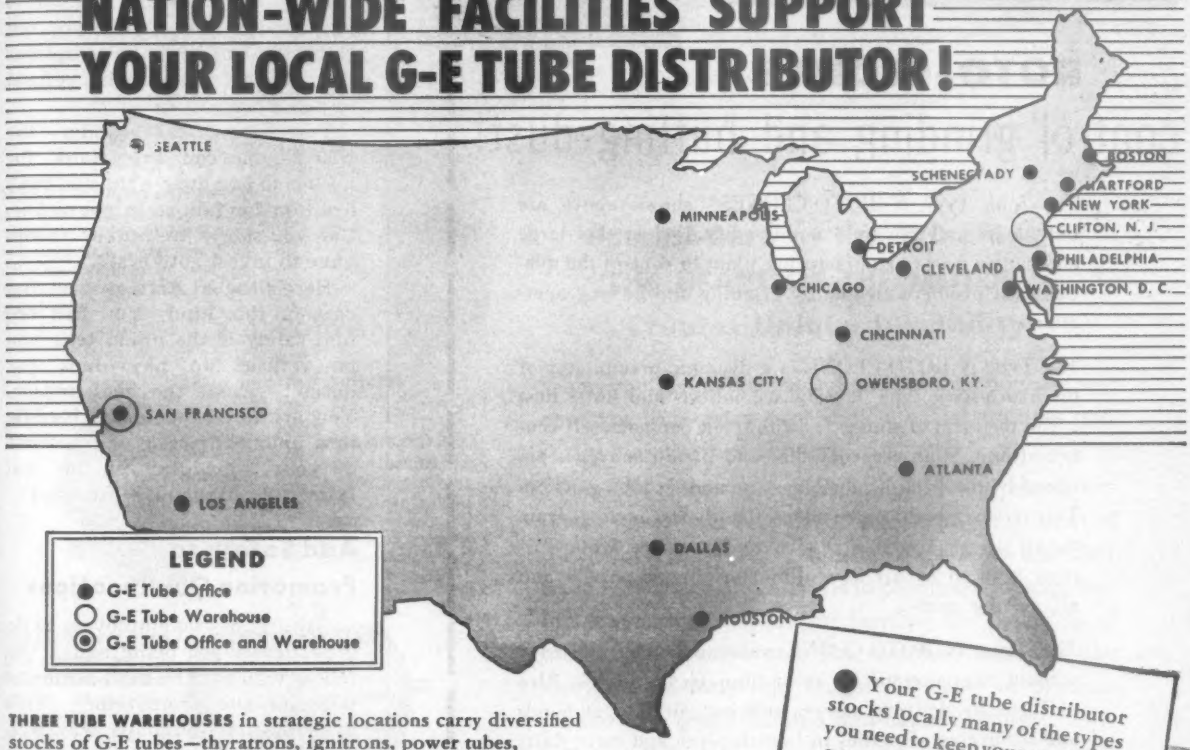
A recent NLRB decision in the Armour Creameries case illustrates again the old truism that the kind of labor relations you have depends on you—the plant operating executive—not the top management.

The top management of Armour Creameries had established a no-union-shop policy. The contract with the union lacked a union-security clause. But the plant superintendent denied work to an employee who refused to yield to the union demand that he join up. Result: The company—and the union, too—was found guilty of an unfair labor practice.

Turn the page

Wherever you are

NATION-WIDE FACILITIES SUPPORT YOUR LOCAL G-E TUBE DISTRIBUTOR!



THREE TUBE WAREHOUSES in strategic locations carry diversified stocks of G-E tubes—thyratrons, ignitrons, power tubes, many others—from which overnight shipments can be made to replenish your tube distributor's supplies.

18 TUBE OFFICES from coast to coast have as their goal first-class service to you, the industrial-tube user.

MODERN TUBE FACTORIES of the General Electric Company are busy 'round-the-clock, turning out electronic tubes that are *pre-tested* for superior performance in your plant. G. E. builds more industrial tubes than any other manufacturer. There can be no better proof of quality and value!

LONG TUBE EXPERIENCE . . . here G. E. leads, with many tube-development "firsts", and an unrivalled background in applying electronics to industry. You buy this practical experience when you install a General Electric tube!

You can put your confidence in—

GENERAL ELECTRIC

180-KA6

● Your G-E tube distributor stocks locally many of the types you need to keep your machines operating full-time. For *all* your tube requirements, he's your preferred source. Not only is your distributor backed by G.E.'s extensive tube facilities, but he's anxious to serve you well, knowing that in this way he serves his own best interests. Keep his phone-number handy, so you can dial him quickly in tube emergencies! *General Electric Company, Electronics Division, Schenectady 5, New York.*

today's best buy is better air!

Type N ROTO-CLONES exhausting grinding and buffing operations.

ROTO-CLONES

control grinding and buffing dust!

The four Type N ROTO-CLONES* shown above are only a part of the total number installed in this large automotive parts manufacturing plant to control the difficult dust problem created by grinding and buffing operations.

The Type N ROTO-CLONE is a dynamic precipitator of the hydro-static type. It exhausts, collects and stores dust . . . in the form of sludge . . . within one compact, self-contained unit. High efficiency dust and fume removal is obtained by the Type N's dual washing and scrubbing action. This removes both coarse material and extreme fines from the air stream, even in excessive concentrations. Water curtains induced by air flow eliminate pumps, nozzles and all moving parts.

The Type N ROTO-CLONE maintains peak efficiency without interruptions for reconditioning or service. Also uniform air delivery assures sufficient air flow at hoods and unvarying velocities in branch pipes and main ducts at all times.

The complete line of AAF ROTO-CLONES offers a wide selection of performance and operating characteristics that will efficiently control every dust source. For the correct solution to your dust or air pollution problem call your nearby AAF representative or write direct to us.

**ROTO-CLONE is the trade-mark (Reg. U.S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

AAF American Air Filter COMPANY, INC.

361 Central Avenue, Louisville 8, Kentucky • In Canada: Darling Bros., Ltd., Montreal, P. Q.

PRACTICAL LABOR RELATIONS

Begins on page 200

What About Firing a Worker for Non-Payment of Dues?

Try this one and see if you come up with the right answer:

The union asks you to fire Hank. They say he refused to pay his dues. But when you tell Hank the bad news, he complains that the real reason is his refusal to pay a fine.

You know that under the NLRB you can fire Hank for failure to pay dues—but you can't fire him for failure to pay a fine. Can you safely fire him or do you have to investigate first?

Here's the NLRB's answer in a case of this kind: You can fire him safely if the union tells you he refused to pay dues but doesn't reveal the real reason. You are not expected to meddle into union affairs in the absence of your knowledge of the real facts. (*Westinghouse Electric*)

Add Safety to Promotion Qualifications

"Ability of two employees to do a particular job being equal, the fellow who has the most seniority will get the promotion." This principle has found its way into thousands of union contracts.

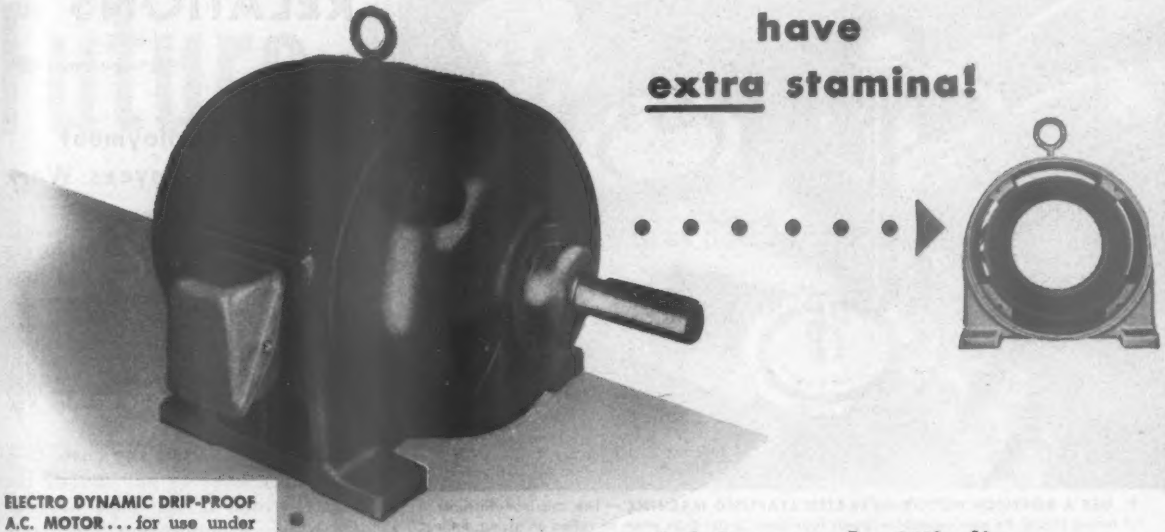
In determining ability, factors like the employee's mental aptitude and his skill with the tools of the job are usually considered. Now an arbitrator adds another factor: How is he safety-wise?

The arbitrator's ruling: If the job in question is one that may affect the safety of other workers, you can pass over a senior employee if the junior would handle the job in a much safer way. In this case, the job was that of timberman. (*Eagle-Picher Award*)

Turn the page

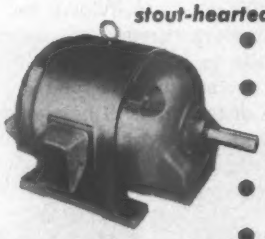
ELECTRO DYNAMIC MOTORS

have
extra stamina!



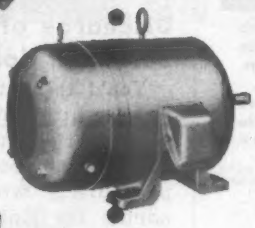
ELECTRO DYNAMIC DRIP-PROOF A.C. MOTOR . . . for use under ordinary industrial conditions not requiring protection from splashing liquids or from atmosphere laden with dirt or metal chips.

E. D. MOTORS are *stout-hearted motors!*



SPLASH-PROOF A.C. . . . For installation where the motor is subjected to splashing liquids or to hosing down for cleaning.

TOTALLY ENCLOSED (Fan Cooled) A.C. . . . . For dirt-laden atmosphere, especially in installations requiring a motor of compact dimensions.



DRIP-PROOF D.C. . . . Adjustable speed motor for general industrial use.

Special Care at the Windings— "THE HEART OF THE MOTOR"— Creates Unique Durability

When you install Electro Dynamic motors you can say goodbye to worries over critical motor failures and costly maintenance expense.

For E.D. motors, although competitively priced, are built with special care at the windings—"the heart of the motor". Here men of unusual experience and skill work with superior materials to produce windings that are tough and durable far beyond the demands of ordinary industrial use. The exacting needs of the *marine* field long ago taught E.D. how to produce motors with great stamina and dependability!

Every E.D. motor is dynamically balanced. All frames are corrosion-resistant and are of heavy cast construction. Write today for illustrated literature on this fine line of motors.

Industry has learned what marine engineers have known since 1880

ELECTRO DYNAMIC
builds great motors

ELECTRO DYNAMIC • Division of the Electric Boat Company • Bayonne, New Jersey

3 easy ways to cut your production costs

1. USE A BOSTITCH MOTOR-OPERATED STAPLING MACHINE — like this manufacturer of fishing tackle. He now assembles spools *four times faster* than when he relied on gluing. Both hands are free to handle the work. You, too, can cut your costs in fastening wood, light metal, paper, leather, rubber or plastics . . . in any combination.

2. USE A BOSTITCH P4 STAPLING PLIER — like this manufacturer who uses it to seal small cartons. Applies staples as far as 4¾" from edges. Its thin blade slides easily between folds. "Indispensable with us because it saves time, tape, rope . . . and gives us a more securely packed carton," is the way one enthusiastic user puts it.

3. USE A BOSTITCH T5 TACKER — here shown stapling backings to mirrors. "Twice as fast as hammer and tacks," report many users. And no wonder! Position it, squeeze it . . . that's all. Drives staples within 1/16" of inside corners. One hand free for holding work. No bruised fingers . . . no marred edges . . . no fumbling for tacks.

ATTACH THIS COUPON TO YOUR LETTERHEAD and find out how Bostitch stapling machines can help you save labor, speed production, cut costs. Over 800 models to fit your needs exactly. 300 field men in 112 cities in the U. S. and 11 cities in Canada to give you nearby service.

BOSTITCH
fastens it better AND FASTER with wire
ALL TYPES OF MACHINES FOR APPLYING STAPLES
ALL TYPES OF STAPLES APPLIED BY MACHINES

BOSTITCH, 402 Mechanic Street, Westerly, R.I.

My problem involves fastening.....

to..... I now use.....

Name..... Title.....

Firm .....

Street .....

City..... Zone..... State.....

PRACTICAL LABOR RELATIONS

Begins on page 200

Watch Unemployment Taxes If Employees Work in Several States

If some of your employees work in several states, you may have an unemployment tax problem on your hands. To which state do you pay the tax?

As a general rule, if services are localized within a state, you pay in that state.

But if that's not the case, then you may have to pay in (a) the state which is the base of your employee's operation or from which he is directed or controlled, provided he does some real work there; or (b) if he does not work in the "home" state, then you may have to pay in the state of his residence — provided he does some work there.

This is an over-simplification of the law, to give you a rough idea of the kinds of headaches involved. If you have this kind of problem, you'd better check your state laws right away.

Discharge of Numbers Salesmen Upheld

You'd think that there would be very little doubt about an employer's right to fire a worker who sold numbers in the plant—particularly where the worker admits his guilt. But a union actually took International Harvester to arbitration on this issue.

The question: Was discharge too heavy a penalty? The arbitrator said that for ordinary gambling the penalty might be too tough—but *not* for numbers.

Turn the page

Cash in your Scrap!

We need more scrap to make more steel.

Plan Now to Cut Future Expansion Costs

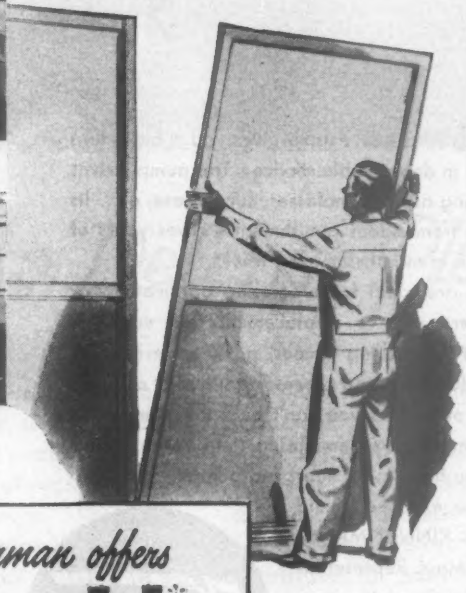
FROM THIS

TO THIS

WITHOUT THIS

thousands of offices now enjoy the greater economy of

HAUSERMAN MOVABLE INTERIORS



IT PAYS TO PLAN AHEAD . . . and *now* is the time to plan for the finest modern wall construction — without dirt, confusion and time-wasting delays —when you remodel or expand your offices.

Constantly expanding demand for Hauserman *Movable* Interiors has resulted in heavy *immediate* production requirements. By anticipating your needs as far in advance as possible, however, you can be sure of having your Hauserman installation delivered and erected *on schedule.*

Your nearby Hauserman Representative will gladly answer your questions and give you detailed information about the many cost-saving Hauserman advantages.

Write to The E. F. Hauserman Company, 7506 Grant Avenue, Cleveland 5, Ohio.

Only Hauserman offers

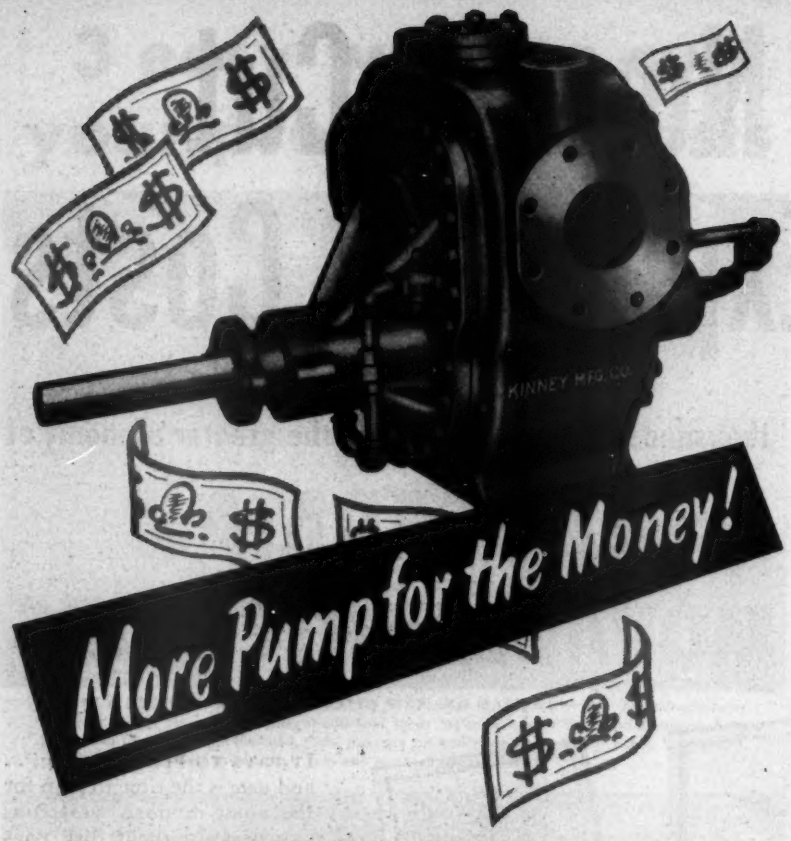
Korweld*

A new non-metallic panel construction which *exclusively* combines the best features of *all* types of interior partitions. It is soundproof . . . moisture-proof . . . rigid . . . strong . . . durable...stays permanently flat. It's another result of unending research by Hauserman — pioneer in the conception, development and production of modern movable interiors.

*Trade Mark

PARTITIONS • WAINSCOT • RAILINGS
COMPLETE ACCESSORIES

HAUSERMAN
Movable Interiors



Kinney Model SD Rotating Plunger Pump gives you a big return on your investment: the utmost in dependable service. This pump thrives on difficult jobs such as pumping asphalt, molasses, cup grease, etc. Its unique mechanism withstands tremendous punishment — gives years of service where other pumps fail in months or even weeks.

Highly efficient, SD Pumps are ideal for processing applications or materials handling jobs where positive displacement and complete dependability are required. For handling viscous, gassy materials; for pumping petroleum products; for delivering process additives at constant flow rates; and for countless other jobs you can't beat the Kinney SD.

Next time you have a pumping problem, bring it to Kinney. Our engineers will gladly show you how to get improved pumping performance at reduced maintenance expense. Send coupon for illustrated catalog. KINNEY MANUFACTURING CO., Boston 30, Mass. Representatives in New York, Chicago, Cleveland, Houston, New Orleans, Philadelphia, Los Angeles, San Francisco, Seattle, and foreign countries.

Kinney LIQUID PUMPS

KINNEY MANUFACTURING COMPANY
3624 WASHINGTON ST., BOSTON 30, MASS.

Please send me Bulletin L51 describing Kinney Liquid Pumps. My liquid pumping problem involves:

☐ Acid Sludge	☐ Lube Oils	☐ Molasses	☐ Tar
☐ Asphalt	☐ Edible Oils	☐ Paint, Enamel	☐ White Lead
☐ Chocolate	☐ Fuel Oils, Diesel Oil	☐ Road Oil	☐ Others (see letter attached)
☐ Crude Oil	☐ Grease	☐ Soap, Glycerine	

*Name*_____ *Company*_____

*Address*_____

PRACTICAL LABOR RELATIONS

Begins on page 200

BRIEF BUT IMPORTANT

▸ **Wage surveys** — If you use a wage survey in union negotiations to show your wages are in line, be prepared to show the survey to the union. If you don't show it, the NLRB can say you have not met your legal obligation to bargain. (*Westinghouse*)

▸ **WSB negotiation policy** — It's pretty clear that you aren't going to get much advance help from the WSB as to the kind of wage increase you can agree upon with the union. The Board emphatically announced a hands-off negotiation policy. It's up to you to figure out what is allowable.

▸ **Group insurance for unions** — In Florida, unions can take out group life insurance covering one local — but not more than one. This is the rule of the state's attorney general. But, not being sure of his opinion, he intends to start a declaratory judgment proceeding to clarify the law.

▸ **Physical examinations for employees**—Five states, Arkansas, Illinois, Minnesota, New Hampshire, and North Carolina now require employers to pay for physical examinations of applicants for jobs when the examination is a pre-requisite to getting a job.

▸ **Cash payments for insurance**—Illinois now requires an employer to accept cash payments for insurance or other protection premiums from a worker who is sick or whose earnings do not permit deduction of the amount of the premiums.

This is a Defense Plant, too!

Be sure to include your *industrial distributor* in your procurement program. He, too, is organized for defense—his country's, and yours!

How can *you* make better use of your distributor in a period of scarcities? Two ways:

First, make a practice of buying through your distributor those products most suitable to *his* type of distribution. He can carry part of your inventory for you, delivering from his nearby warehouse in accordance with your needs. He can "lump" shipments otherwise requiring transportation from a number of distant points. He can save you purchasing time and cut your paper work to a fraction.

Second, keep him *informed* of what products you regularly need—particularly of those you have difficulty getting. His contacts may prove valuable to you . . . he can often suggest satisfactory substitutes for hard-to-get items. He is just as eager to ship you scarce items as you are to get them—he will do his utmost to keep you supplied if you'll tell him what you want.

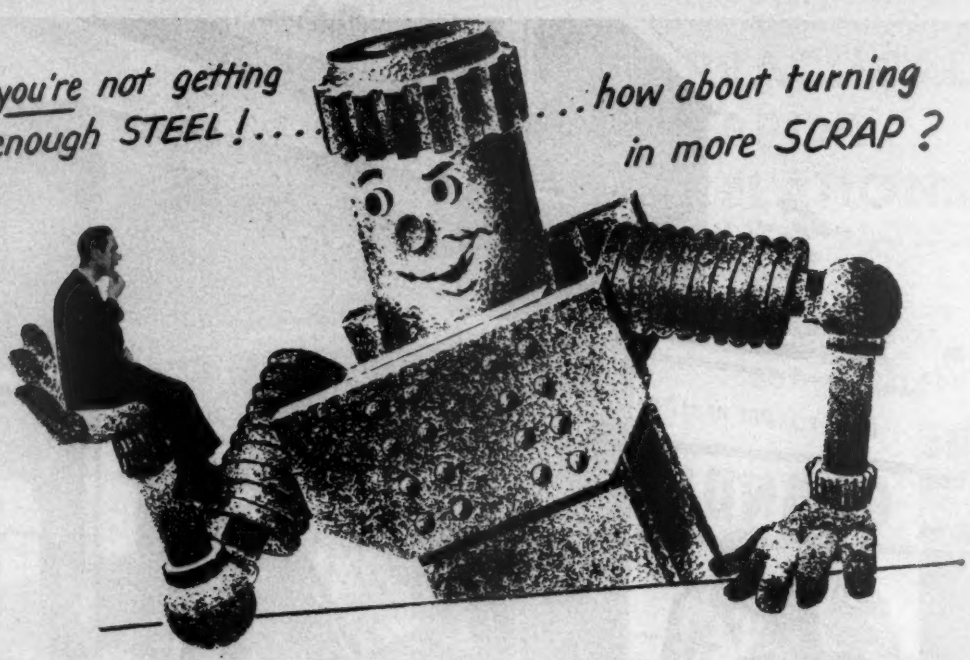
Remember—your distributor is on *your* team. Let him carry the ball!

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

RB&W
THE COMPLETE QUALITY LINE

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Dallas, Oakland. Sales agents at: Portland, Seattle. Distributors from coast to coast.

106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG



There's only one quick way to get more steel!

...get more SCRAP to the mills, at once

LET'S be realistic about the scrap shortage. The need for scrap is desperate. It theatens to hamper our whole National Defense effort—and it vitally concerns *you* because it boils down to this:

Unless 100,000 tons of industrial scrap roll into the steel mills every day, steel production will drop, and there'll be *less* steel for everyone—you included.

On the other hand, if more scrap is turned in, more steel will be turned out—and the more steel that's made the more steel *you'll* get.

So—if you want more steel—do your full share in getting your scrap back to the mills. Comb through your plant, again and again. Tap every source of dormant scrap. Dig out every retired machine that you can possibly spare and rush it to your scrap dealer. Rip out any old rails and switches that are rusting away on unused sidings—and scrap them. Scrap your antiquated dies, jigs and fixtures, your worn-out tanks and boilers that are gathering dust in some forgotten corner. Make sure that not a single pound of scrap is by-passed. Sell it—ship it. It means good money for you, more scrap for the Nation's scrap pile, and more steel for *everyone*.

• • •

Remember—the Nation's productive effort depends primarily on steel—and steel depends on SCRAP . . . *your* scrap. Turn it in—NOW.

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

This page would ordinarily be used to tell you about

U·S·S MANGANESE STEEL RAILROAD CROSSINGS

but, because without SCRAP we cannot produce steel, we are asking instead for your all-out help in getting more SCRAP to the mills.

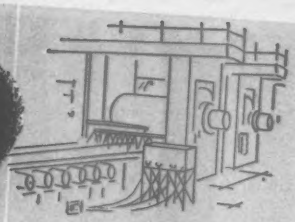
UNITED STATES STEEL COMPANY, PITTSBURGH · COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, FAIRFIELD, ALA. · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

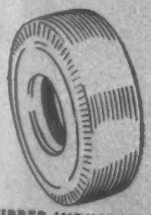
1-1902-A

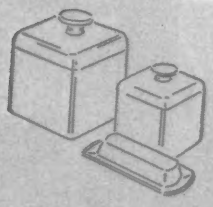
UNITED STATES STEEL

It's the EXPERIENCE that counts...

PRINTING INDUSTRY

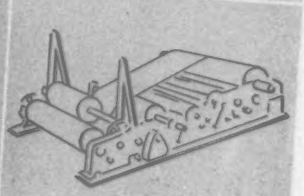

STEEL INDUSTRY

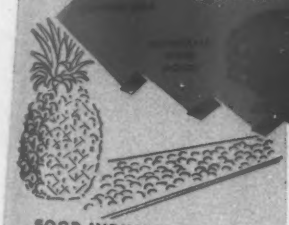

RUBBER INDUSTRY

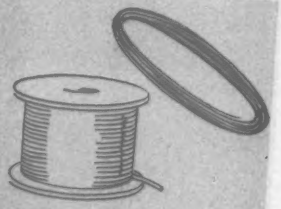

PLASTICS INDUSTRY

Reliance V★S is the result of nearly 50 years' experience in the engineering and application of Adjustable-speed Drives

V★S Drive provides an unlimited range of speeds from A-c. circuits. In addition, V★S offers controlled acceleration and deceleration; slow speed for jogging, inching or creeping; fast, smooth reversal at any point desired and other specialized functions to suit particular applications. Safe, simplified control saves man hours—reduces operator fatigue. Centralized operator's station for the control of one or more drive motors can be located at any convenient point. Write today for *new* V★S Drive Bulletin D-2311.


PAPER INDUSTRY


FOOD INDUSTRY

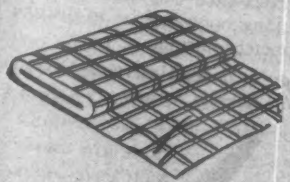

WIRE AND CABLE INDUSTRY

MINING INDUSTRY

CHEMICAL INDUSTRY

PROOF of PROGRESS!

Just after the turn of the century, the lathe above made news with its adjustable-speed Reliance Armature-shifting Motor. Modern lathes (right) have built-in Reliance V★S Drives to provide control of all functions of spindle and speeds.


TEXTILE INDUSTRY

METAL FABRICATING INDUSTRY

RELIANCE ELECTRIC AND ENGINEERING CO.

1070 Ivanhoe Road, Cleveland 10, Ohio • Sales Representatives in Principal Cities

The Christmas that starts in the summer!

For some people, the Yuletide season starts around July.

They're the department store buyers of America – and they do their Christmas shopping really *early*. They begin their purchasing months in advance of the Christmas buying spree.

But despite careful buying, December is a wild, unpredictable month. Shelves are quickly emptied. Sell-outs become the rule. Thousands of sales may be lost through simple lack of merchandise.

But these buyers know the answer. To them, a sell-out means one thing—a quick call for more merchandise, via Air Express!

The world's fastest shipping service fills their shelves overnight!

Whether you buy or sell goods, here are the unique advantages you can enjoy with regular use of Air Express:

IT'S FASTEST – Air Express gives the fastest, most complete door-to-door pick-up and delivery service in all cities and principal towns, *at no extra cost.*

IT'S MORE CONVENIENT – One call to Air Express Division of the Railway Express Agency arranges everything.

IT'S DEPENDABLE – Air Express provides one-carrier responsibility all the way and gets a *receipt upon delivery.*

IT'S PROFITABLE—Air Express expands profit-making opportunities in distribution and merchandising.

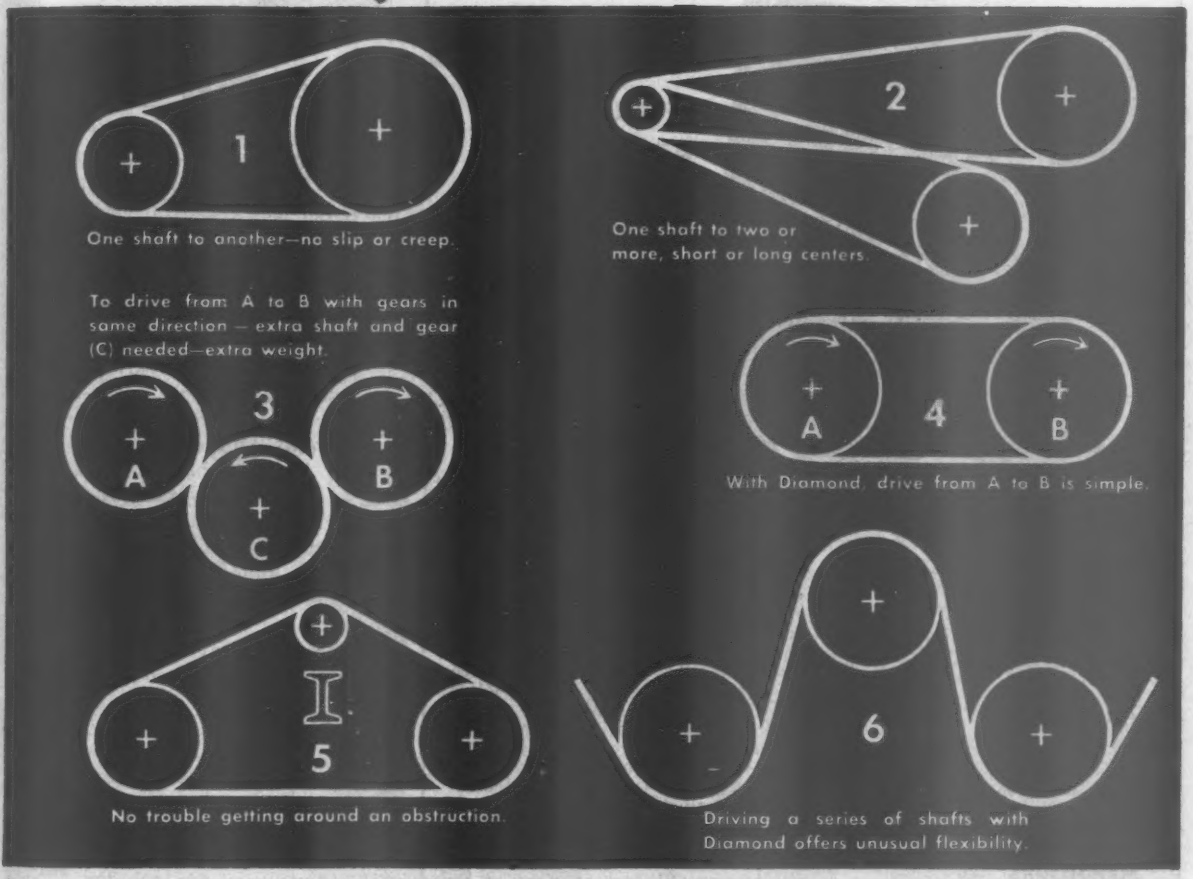
For more facts call Air Express Division of Railway Express Agency.

AIR EXPRESS

GETS THERE FIRST

DIAMOND ROLLER CHAINS

Simplify Power Transfer


1
One shaft to another—no slip or creep.
2
One shaft to two or more, short or long centers.
To drive from A to B with gears in same direction — extra shaft and gear (C) needed—extra weight.
3
A
B
C
4
A
B
With Diamond, drive from A to B is simple.
I
5
No trouble getting around an obstruction.
6
Driving a series of shafts with Diamond offers unusual flexibility.

REDUCE COSTS AND WEIGHT, FACILITATE ASSEMBLY

● The few examples outlined above show the flexibility of Diamond Roller Chain application—and how simplification is attained.

Assembly and disassembly are simple—drives from one shaft to another or to several other shafts present no problem. Compare drawings (3) and (4) above. To rotate two shafts in the same direction by gears requires a third gear and shaft, while the Diamond Chain as in (4) does the job whether the center distances are short or long and regardless of the speed ratio. And there is no slippage.

In (5) the ease of getting around an obstruction is illustrated and (6) shows how a series of shafts can be positively rotated with sprockets of various sizes to provide the speed of rotation desired.

Diamond Roller Chains do these jobs and many others with long-life, low-cost dependability, for every link is precision made by workmen skilled in chain making for over 60 years.

DIAMOND CHAIN COMPANY, Inc.

Dept. 449, 402 Kentucky Avenue **Indianapolis 7, Indiana**

Offices and Distributors in All Principal Cities

Refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

FOSTORIA INFRA-RED
Streamlines Production

FOR FINISH BAKING AND OTHER HEAT APPLICATIONS

Read these Results Typical of Thousands of FOSTORIA INFRA-RED INSTALLATIONS

EATON MFG. CO., Cleveland, Ohio, uses the 44 ft. 118 KW Fostoria oven, pictured above, to bake paint on auto heater parts. Mr. George Zidich, foreman of their subassembly dep't says: "The smoothness and efficiency of our entire operation depends upon our speedy Fostoria infra-red oven. We save drying time, and still get the kind of finish we want. Infra-red drying gives an even, longer lasting, tougher finish." Baking time on this completely conveyorized job is 3-2/10 minutes at 300°F.

Back of every Fostoria Infra-red oven recommendation are many years of intensive research — the foremost knowledge of Infra-red applications — the unequalled engineering skill and experience of many thousands of highly successful installations. Today, Fostoria Infra-red equipment is recognized as the highest efficiency standard of industry everywhere. Whatever your baking, drying, degreasing, or industrial heating problems may be, investigate now, the streamline efficiency and lower "per piece" production cost for your operations with Infra-red ovens as engineered by Fostoria.

SAVES SPACE

Fostoria Infra-red ovens operate on a comparatively short cycle which results in smaller oven requirements. They may also be suspended from ceiling mounts to eliminate floor space entirely.

SAVES TIME

Reduces processing time from hours to minutes because of the inherent speed of Infra-red. There is no time lag in starting an oven, the heat is instantaneous.

SAVES MANPOWER— MANHOURS

Ideal for conveyorized production methods. Reduces excessive product handling. Turns out more pieces per day with ease, with less people.

CUTS COSTS

Faster production, lower operating costs, improved quality, result in lowest "per piece" cost.

GET THE FACTS ON FOSTORIA "KNOW HOW" HELP TO REDUCE YOUR "PER PIECE" PRODUCTION COST

Write, today, for this factual information on the Infra-red process and equipment as engineered by Fostoria. Technical data applicable to your operations will be included if you send us general facts about your particular problem. A Fostoria representative will gladly analyze your production needs and submit definite recommendations and carefully forecasted results for your consideration.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO
Oldest and Largest Manufacturers of Industrial Infra-red Ovens

INFRA-RED fostoria SYSTEM

Use the coupon on page 121 or 224 to get these important . . .

Free NEW CATALOGS

Begins on page 121

PIPELINES AND FITTINGS

Valves

8 This one gives you 22 pages of information on valves for boiler services. You get illustrations, dimensions, other specifications. Gives operating instructions and lists special features. Section on fire protection valves, exploded view of angle and straightway "Y" valves. Everlasting Valve Co.

Special Alloys

9 This one has 20 pages about special-purpose alloys for corrosive applications. Charts show physical properties of the metal pipe, comparisons with other materials for corrosion resistance. Well illustrated. Information on available sizes and applications. Ampco Metal, Inc.

Tube Fittings

10 A 12-page bulletin on torque-free, leakproof tube fittings. Specifications and illustrations. Nuts, ferrules, unions, male and female connectors, tees, and reducers are included. Crawford Fitting Co.

AIR CONDITIONING

Air Conditioning

11 Air conditioning equipment for many industrial uses is described in this catalog. Tells what air conditioning has done for other companies. Photographs of equipment, installations. 16 pages. Chrysler Corp.

Heaters and Convectors

12 Bulletin gives features and capacities for steam unit heaters, convectors, and blower-type space heaters. Illustrated. Airtherm Manufacturing Co.

Turn the page

4 BIG REASONS

Why LYON Can Handle Your Sheet-Metal Subcontracts BETTER!

MAIL COUPON FOR THIS BROCHURE • IT TELLS ALL

LYON METAL PRODUCTS, INCORPORATED
1212 Monroe Avenue, Aurora, Illinois

Please send me a copy of LYON'S DEFENSE PRODUCTION BROCHURE which explains the 4 big reasons why Lyon can handle sheet metal subcontracts better.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

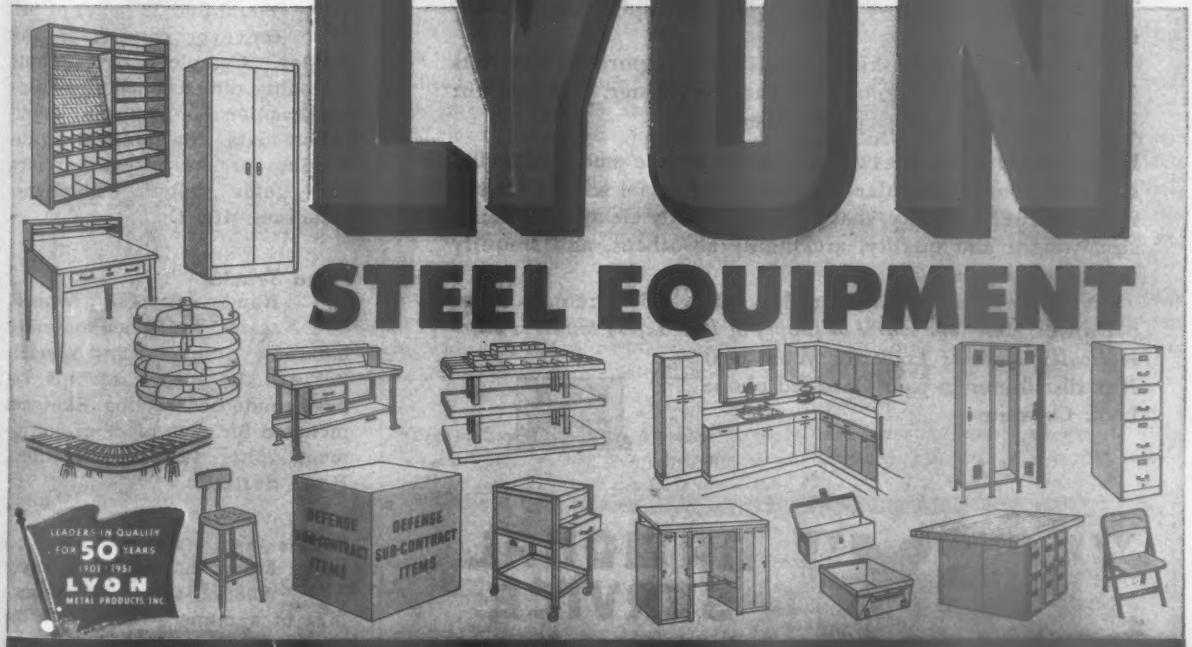
2 STRATEGIC PLANTS . . . AURORA, ILL., AND YORK, PA.

LYON METAL PRODUCTS, INCORPORATED

General Offices: 1212 Monroe Avenue, Aurora, Illinois

LYON

STEEL EQUIPMENT


LEADERS IN QUALITY FOR 50 YEARS 1901 1951 LYON METAL PRODUCTS INC.
DEFENSE SUB-CONTRACT ITEMS
DEFENSE SUB-CONTRACT ITEMS

A PARTIAL LIST OF LYON STANDARD PRODUCTS

- Shelving
- Lockers
- Stools
- Bin Units
- Kitchen Cabinets
- Cabinet Benches
- Storage Cabinets
- Welding Benches
- Conveyors
- Bar Racks
- Tool Boxes
- Parts Cases
- Economy Locker Racks
- Flat Drawer Files
- Tool Room Equipment
- Wood Working Benches
- Display Equipment
- Drawing Tables
- Revolving Bins
- Hanging Cabinets
- Filing Cabinets
- Folding Chairs
- Work Benches
- Bench Drawers
- Service Carts
- Sorting Files
- Drawer Units
- Hopper Bins
- Tool Stands
- Shop Boxes
- Tool Trays
- Shop Desks

Now! KEX PUTS SAFETY MESSAGES RIGHT INTO YOUR EMPLOYEES' HANDS

HERE'S AN ADDITIONAL KEX SERVICE that ties in with your *Safety Program*—flashes its messages to the employee right at a place *where accidents happen*. And builds better employee relations.

Now a percentage of KEX* towels have printed on them safety slogans such as—Work Safely—Apply More Caution; Alert Today—Alive Tomorrow; Always Alert—Nobody Hurt; to mention a few.

In these days when skilled hands are so important, KEX puts into them not only a wiping tool that does a faster, more efficient job, but which also helps protect them.

INVESTIGATE KEX NATIONAL SERVICE—the smooth-flowing service that means regular delivery of industrial wiping towels, in any desired quantity, that are hygienically clean, uniform in size, weight and quality, are highly absorbent, and simplify plant housekeeping.

No investment. Nothing to buy. Only a low rental charge per towel. *And your source of supply of KEX safety towels is automatically assured!* Look for your local KEX distributor in your classified phone book. Or write—

"KEX" NATIONAL SERVICE

*REG. U.S. PAT. OFF.

295 Fifth Ave., New York 16, N. Y.

Use the coupon on page 121 or 224 to get these important . . .

Free NEW CATALOGS

Begins on page 121

INSTRUMENTS

Torque Measurement

13 If you're interested in torque measurement, you'll like this one. It has 14 pages of sketches, price listings, and specifications of torque analyzers and torque wrenches. Richmont, Inc.

Optical Comparators

14 A 32-page catalog on optical comparators for inspection. Parts illustrations, applications, photographs, and complete specifications tell you all about the instruments. Attachments also shown. Jones & Lamson Machine Co.

MATERIALS HANDLING

Conveyor Carriers

15 You'll find 18 pages of belt conveyor carriers in this catalog. Complete descriptions, including dimensioned drawings, construction features, and application data. Sections on antifriction carriers, return carriers, and guide rollers. Stephens-Adamson Mfg. Co.

Hand Trucks

16 Hand trucks, wheels, scales, and other materials handling equipment and specialties are the subject of this 12-page condensed catalog. Sketches included for each piece of equipment, plus full specifications. Howe Scale Co.

Scales

17 Folder has pictures, specification sheets and drawings of a crane scale. Tells the advantage of this type of weighing, and shows how it works. Hydroway Scales Co.

Turn the page

Good Lighting Means More Production

Production men know that adequate light means a higher rate of production, less spoilage and improved employee morale. But solving the problem of insufficient light does not mean merely increasing the footcandles of light intensity . . . because too much light or glare is just as harmful as too little light. Light must be adequate *and* comfortable.

In the picture above,* you see a plant lighted entirely by Day-Brite fixtures. Here workers see clearly, without strain . . . without glare or shadows because Day-Brite's quality lighting fixtures are designed to insure light that is both *adequate and comfortable.*

Hundreds of large American factories use Day-Brite fixtures exclusively and get complete satisfaction . . . because Day-Brite makes only quality fixtures which give years of trouble-free service . . . at the lowest possible installation and maintenance costs.

If *you* have factory lighting problems, Day-Brite will help you solve them, without obligation. Write to Day-Brite Lighting, Inc., 5441 Bulwer Ave., St. Louis, Mo.

**The upward component provided through the reflector apertures minimizes contrast between the fixture and the surrounding ceiling area, adding to the overall comfort of the complete installation.*

NOW, MORE THAN EVER

AMERICA MUST SEE WHAT IT'S DOING

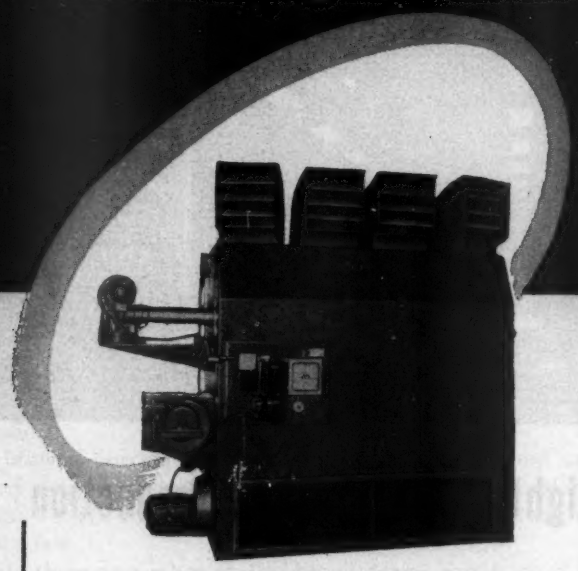
IT'S EASY TO SEE WHEN IT'S

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

158

AIRTHERM
DIRECT FIRED HEATERS
Heat or Ventilate

Installation Requires Less Steel Than Other Type Heating Systems ...Insure Heating Satisfaction



The Airtherm Space Heater has been designed with extreme flexibility for heating as well as ventilating steel plants, foundries, all types of industrial buildings and warehouses. They are quick, easy, and less costly to install and require less duct work and scarce materials. They are furnished complete with all operating and safety controls for automatic operation. Airtherm Space Heaters have a heavy duty steel combustion chamber lined with castable refractory for simple maintenance and long life.

AVAILABLE IN 9 MODELS — Oil* or gas fired — ranging from 650,000 to 2,000,000 B.T.U. per hour output, in floor mounted or suspended types. Write for Bulletin 802A for complete information.

SEE OUR CATALOG IN SWEET'S

AIRTHERM MANUFACTURING CO.
751 South Spring Avenue
St. Louis 10, Missouri

*Approved by Underwriters' Laboratories

For Complete Heating Satisfaction... Think First of **AIRTHERM**

Use the coupon on page 121 or 224 to get these important . . .

Free NEW CATALOGS

Begins on page 121

BUILDINGS

Plate Glass
18 Here's a 16-page catalog to help you select the glass for your windows. There are photographs, light distribution charts for each type. Tables of specifications are included for each rolled, figured, and wired glass in a full line. Mississippi Glass Co.

Windows
19 Bulletin pictures and describes industrial steel windows. In it you'll find complete information about pivoted, commercial, and security windows. There are engineering data, with construction features, and operating and installation details. Detroit Steel Products Co.

Ceilings
20 Folder has detail drawings, design data, and photographs to illustrate the smooth ceiling system of flat slab construction. Lists test data, tells about advantages of flat slab design. Smooth Ceilings System.

Paint
21 This 12-page booklet tells you about a paint that stays clean longer. Tests are shown and test panels pictured to show how the paint works. There's a chart to illustrate how the paint cuts washing time. Enterprise Paint Mfg. Co.

Floors
22 Bulletin tells you how to handle 10 types of floor maintenance. Recommendation for various types of floors are given, and a complete line of floor cleaning materials is shown. Tells how to use each cleaning compound. Masury-Young Co.

Turn the page

it's SPANG "CW" pipe

in PITTSBURGH'S GATEWAY CENTER

Floor upon floor the three skyscrapers in Pittsburgh's Gateway Center climb persistently upward. And, in each building, the installations of Spang "CW" Pipe follow the structural steel from bottom to top.

These modern office buildings, when finished, will be equipped from top to bottom with Spang "CW" Pipe—a complete system of piping for air conditioning, chilled water system, heating, sanitary facilities, etc.

The selection of Spang "CW" Pipe for this important construction project is further recognition of the controlled quality of Spang pipe mill products—widely known for durability and dependability for more than a century.

Wherever pipe is specified in commercial, residential or industrial construction, be sure to ask your jobber for Spang "CW". That trade mark is *your guarantee* of *customer satisfaction.*

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• • • • Put it to work—a CLARK fork-lift truck, that is; or a CLARK powered hand truck, or an industrial towing tractor—in your PLANT MAINTENANCE program, and it will *Serve You Right*, just as it *Serves You Right* in your materials-handling operations.

Take the CLARK fork-lift truck, for example: Gas-powered or electric battery-powered, it can be switched in a jiffy from handling materials to serving as a mobile shop elevator (see cut above). Or it can switch as easily into the role of an adjustable scaffolding for any kind of overhead work or repairs. Its ready adaptability makes it a valuable tool for grading, shoveling, snow removal, moving machinery—or for changing electric light bulbs! There's no end to its uses in the hands of an ingenious owner. Truly, it is the answer to the maintenance man's prayers, a joy to the efficiency expert, a boon to the safety engineer and the most profitable investment on the Treasurer's records.

SEE FOR YOURSELF . . . CLARK will exhibit and demonstrate some of its machines in January at the Plant Maintenance Show in Philadelphia. Do stop around at Booth 304 and see for yourself that each and every one of them SERVES YOU RIGHT.

CLARK EQUIPMENT COMPANY • Battle Creek 12, Mich.
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☐ Material Handling News
Name
Firm
Address
City and Zone State

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IMPORTANT NEW Free CATALOGS

Begins on page 121

MISCELLANEOUS

Welding Equipment

23 Data on arc welding accessories are packed into this catalog's 16 pages. Headshields, handshields, goggles, cleaning tools, electrode holders, welding cables, connectors, splicers, and protective clothing are all represented. Full specifications. Hobart Brothers Co.

Stamping Service

24 A metal stamping service is described in this 12-page catalog. It tells what stampings are available, describes production methods, and lists facts to be considered when buying stampings. Pictures of plant operations and manufacturing facilities. Laminated Shim Co., Inc.

Induction Heating

25 Fifteen case studies of manufacturers using induction heating equipment to harden metal. Photographs of the heating operations and the applications employed by the various companies. Also a section on other work - handling machines for special uses. 12 pages. Westinghouse Electric Corp.

Blast Cleaner

26 A 22-page catalog tells how blast cleaning works, how you can use it in your plant, and how to keep it in good working order. Vacu-Blast Co., Inc.

Industrial Heating

27 Bulletin shows how finishes are baked on products using infra-red rays. Gives advantages of process, and pictures drying operations as done by 14 different plants. Fostoria Pressed Steel Corp.

Abrasive Wheels

28 Charts, pictures, specification sheets to bring before you a whole showcase of grinding wheels. Included are comparison charts and a section on adaptors. Straight wheels, mounted wheels, reinforced disc wheels are represented. 26 pages. Bay State Abrasive Products Co.

DUPLICATE COUPON ON PAGE 121

MAIL THIS COUPON FOR FREE CATALOGS *(Good until Feb. 29, 1952)*

FACTORY MANAGEMENT & MAINTENANCE (December, 1951)
330 W. 42nd St., New York 18

I'm circling the numbers of the catalogs and bulletins I want:

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	

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Turn the page

Tape it with Behr-cat*

Masking is faster when BEHR-CAT Tape is on the job. Here's a tape that takes the task out of masking — unrolls easily, flexes in and around corners, and sticks tight on contours. It's got strength to stretch and a grip that holds until you want it to come off. Moreover, it strips off freely—clean and easy . . . no sticky residue left behind and no paint build-up with thin BEHR-CAT Tape. Get all of these advantages on your next masking, protecting or sealing job. Your distributor can supply you or write direct.

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Get the most out of your strapping...

TIE DEFENSE ORDERS WITH GERRARD ROUND STEEL STRAPPING

Two 16 ga. round steel straps close and reinforce this carton of powder. This method of closure permits cartons to be reused many times. Gerrard Model TI machine is mounted on suspension arm.

GERRARD ROUND STRAPPING complies fully with the joint Army-Navy specifications JAN-P-106A, JAN-P-107, and JAN-P-108 for overseas packing. That means it is strong enough to do a good job.

It has other advantages besides strength, however. Because it is round, it is ideal for palletizing either regular or odd-shaped units, and it can be applied as a Diagonal Tie to give secure reinforcement to all six sides of a box or carton.

Why not consult a Gerrard engineer about your defense strapping problems? He may be able to suggest a method of strapping that will help get more use out of your available strapping. Strapping ordered for defense receives preferences in delivery according to current regulations. Strapping available for non-defense orders is being equitably distributed among our customers.

Gerrard Steel Strapping Company,
2927 W. 47th St., Chicago 32, Ill.

Wood products are tied quickly and securely with Gerrard's semi-automatic Model Q machine. This method of bundling saves carton and packing costs.

Odd-shaped units like these auto axles can be easily mounted on pallets for convenient handling. Gerrard Round Steel Strapping grips where it touches, conforms to odd shapes, holds pallet load tightly and safely.

USS **GERRARD ROUND STEEL STRAPPING**

UNITED STATES STEEL

Good Ways to Solve Special PLANT ENGINEERING PROBLEMS

You can get catalogs suggested as answers to these problems by using coupon on page 121 or 224.

ABOUT YOUR SULPHATED POWER STORAGE BATTERIES: You can restore lost battery capacity to full service. Data sheet by Gould-National Batteries, Inc., shows how. *(Circle No. 29 on coupon, page 121 or 224.)*

WORRIED ABOUT RUST? This is the title of a 4-page folder by Rusticide Products Co. It tells how a metal primer applied directly over rusted surfaces stops rust and primes metal for paint. *(Circle No. 30 on coupon, page 121 or 224.)*

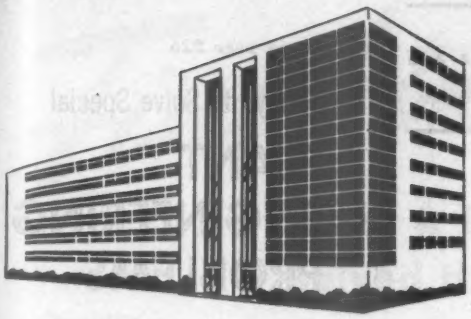
LOOKING FOR AN ACID-PROOF BEARING SURFACE YOU DON'T HAVE TO LUBRICATE? Then don't overlook lignum-vitae hardwood, says the Lignum-Vitae Products Corp. In "Lignum-Vitae Fact Flashes" you will find hundreds of money-saving applications. *(Circle No. 31 on coupon, page 121 or 224.)*

WHEN HIGH TEMPERATURES KILL GOOD LUBRICATION: Your answer might be Ucon synthetic lubricants. Their non-gumming properties keep wheels from sticking, prevent frequent shutdowns. Bulletin by Carbide & Carbon Chemicals Co. describes tough applications. *(Circle No. 32 on coupon, page 121 or 224.)*

CAN'T GET LARGE-DIAMETER STEEL PIPE? Perhaps wood pipe will do —and it costs less, too. Lots of pulp and paper mills use it all the time to carry water and slurry. Handbook of National Tank & Pipe Co. describes uses. *(Circle No. 33 on coupon, page 121 or 224.)*

Turn the page

MISSISSIPPI WIRE GLASS



helps...

Polished Misco Wire Glass, highest achievement of the glass manufacturer's art, combines the utmost in protection with modern beauty.

Polished Wire Glass by Mississippi, approved fire safeguard, helps prevent drafts, is effective in holding fires within bounds of origin.

Send For Catalog No. 51
Free Samples on Request.
For details see
Sweet's Architectural File

Now, more than ever before, it is necessary that constant vigilance is maintained and that every precaution is taken to insure against losses by fire.

Records show that many large loss fires result from exposure through ordinary glass windows.

Mississippi Wire Glass* affords constant protection at minimum cost in windows, doors, transoms, skylights, fire escapes, vertical shafts, partitions, exterior walls and all other places where fire or breakage protection is required... helps to avert tragic and costly fire losses that result from exposure through ordinary glass.

Specify Mississippi Wire Glass — the *original* solid wire glass upon which the Underwriters' Standard was based in 1899... the standard today by which all others are judged. Carried in stock by distributors of quality glass everywhere.

*Approved Fire Retardant No. 32

MISSISSIPPI *Glass* COMPANY

88 ANGELICA ST. SAINT LOUIS 7, MO.

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This Seal Identifies Mississippi Wire Glass

WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

SMALL TOOLS ARE SCARCE...
how good is your control?

New Illustrated Bulletin FREE ON REQUEST

....presents step-by-step procedure used profitably in hundreds of plants...how it works to—

- . . . Record each employee's tools or gages, preventing hoarding, theft and loss;
- . . . Recover idle tools;
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- . . . Reduce tool breakage;
- . . . Locate each tool, loaned or in crib;
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- . . . Stop arguments and otherwise speed service;
- . . . With no increase in crib personnel—

Fully described in this bulletin

Complete control of your tools and gages will save dollars and headaches in the months ahead. Mail coupon for your copy today.

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Begins on page 226

Good Ways to Solve Special
PLANT ENGINEERING PROBLEMS

You can get catalogs suggested as answers to these problems by using coupon on page 121 or 224.

WHEN DUST OR FUMES PLAY HOB WITH CONTROL SWITCHES: That's the time and place, says Micro Switch, you can use Honeywell Mercury switches to good advantage. Bulletin No. Hg-1 tells how to select right type in a-c or d-c. *(Circle No. 34 on coupon, page 121 or 224.)*

WANT PHENOLIC RESIN COATINGS APPLIED AT YOUR PREMISES? The Lithgow Corp. will apply protective baked-on coatings in your own plant. It will cover or line process piping, tanks, filters, pumps, fans, and similar equipment. Pamphlet describes wide benefits of Lithcote. *(Circle No. 35 on coupon, page 121 or 224.)*

IF SLOPPY MILK HANDLING'S A PROBLEM in your plant cafeteria, maybe Vacuum Can Co.'s portable milk dispenser would help clean things up. It's light, sanitary, and requires no installation. *(Circle No. 36 on coupon, page 121 or 224.)*

TO PUT OUT FIRES IN HIGH PLACES, use a new portable foam tower. Just wheel it to the scene. It's easy to assemble and use, and is lightweight and effective, according to Pyrene Mfg. Co. *(Circle No. 37 on coupon, page 121 or 224.)*

NEED TO WIRE A MOVING PART OF MACHINERY? Sealtite conduit is flexible and liquid-tight, says Anaconda. Has an extruded synthetic covering over metal core. Moisture, oil, dirt, corrosive fumes, and abrasion won't affect it. *(Circle No. 38 on coupon, page 121 or 224.)*

Finishing Problem?

Black & Decker Sanders and Polishers have solved them for thousands of plants, shops!

Speed up sanding, cleaning, polishing, rubbing, grinding!

BLACK & DECKER Sanders and Polishers speed up a raft of finishing jobs because they give you such B&D *quality* features as: (1) dependable B&D-built universal motors for abundant power; (2) match-lapped, spline-mounted spiral bevel gears for smooth, quiet flow of power; (3) perfect balance for easier handling. There are three B&D Sander models to choose from, in 7″ and 9″ disc diam., standard and heavy-duty types—two B&D Polisher models, 7″ Standard and 7″ Automatic, the latter equipped with *exclusive* automatic polish feed.

Whatever your problem, see your nearby B&D Distributor *first* for expert help—and for eye-opening demonstrations of B&D Tools. Write for free catalog to: THE BLACK & DECKER MFG. CO., 623 Pennsylvania Avenue, Towson 4, Md.

BD Black & Decker POWER ELECTRIC TOOLS

WHEN THE WORD COMES TO . .

STEP ON IT!

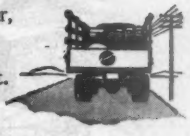
let Barrett SPEED your Roofing Jobs!

The urgency of America's defense program calls for a lot of speed on the part of American industry. And for a lot of new roofs, too! New roofs on new plants . . . and new roofs, or repairs, on old plants, as well.

Nearly 100 years of experience in meeting roofing demands of every kind have fitted Barrett to give you the world's longest-lasting built-up roof in the shortest possible time. For Barrett *speeds* your roofing jobs in 4 important ways.

1 **BARRETT SPEEDS** specifications. Ready at hand are Barrett time-tested, scientifically calculated application specifications for almost every built-up roofing problem. These are so foolproof that Barrett Specification* Roofs can be bonded for 20 years, and generally last much longer. Approved by the National Board of Fire Underwriters—Class A.

2 **BARRETT SPEEDS** deliveries. Strategically located supply points enable us to rush materials to your Barrett roofing contractor, and to your job when they are needed. Barrett does not have to rely on outside sources of supply for roofing pitch and felt. Because Barrett Specification* pitch and felt are made in our own factories, production can be controlled to meet demands. Your Barrett roofer can be sure that he will get the materials he wants when he needs them.



3 **BARRETT SPEEDS** application. The Barrett Roofer can be sure that roofing materials will be of uniform high quality. Application goes smoothly because there is no defective felt or pitch to interrupt and slow down operations. No time lost on the job!

4 **BARRETT SPEEDS** you the finest possible roof. Skilled workmen make for fast jobs. Barrett Approved Roofers have had many years of practical experience, plus well-trained manpower, plus Barrett engineering help, to assure you the finest possible roofing job in the shortest possible time.

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ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
205 W. Wacker Drive, Chicago 6, Ill.
1327 Erie Street, Birmingham 8, Alabama
36th & Gray's Ferry Ave., Philadelphia 46, Pa.
In Canada: The Barrett Company, Ltd., 5551 St. Hubert St., Montreal, P. Q.

Barrett Specification Roofs*

*Reg. U. S. Pat. Off.

But don't wait until you're up against it before ordering necessary roofing work. Call in a Barrett Approved Roofer today, or write us.

This is an "Exploratory" Advertisement

Frankly, we don't know what uses there are for the "Utiliscope" (Wired Television) in your particular industry . . . so in the adjacent ad we are simply telling you what it will do. Based on our experience in various fields, we suspect there are many places where the "Utiliscope" will help you improve product quality, save manpower, prevent accidents or increase production.

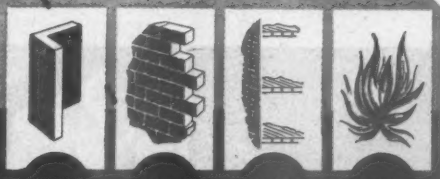
If you want to look into the possibilities of the "Utiliscope", simply write us for a copy of Bulletin 1025G which explains the equipment and shows various applications. Please address your request to Department "G".

Diamond Power Specialty Corporation
Department "G"
LANCASTER, OHIO

NOW You Can *See* Where You Can't *Look*

The DIAMOND "UTILISCOPE"
(WIRED TELEVISION)

CONTINUOUS OBSERVATION by "UTILISCOPE" CAMERA



These Are *NO LONGER* Obstacles to Seeing Exactly What Is Happening

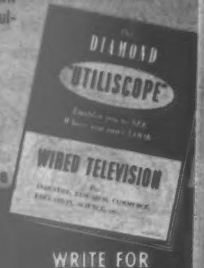
The Diamond "Utiliscope" (television which transmits by wire instead of by broadcast) provides a clear, faithful, instantaneous reproduction at a distance of any operation, scene or demonstration. The image can be brought right to the control panel, or desk of the operator or supervisor. Obstacles that prevent direct observation (such as danger, distance, building members, etc.) are not obstacles to the "Utiliscope" which enables you to "SEE where you can't LOOK." There is no measurable time lag and the "Utiliscope" cannot give incorrect information.

The "Utiliscope" is surprisingly simple . . . has fewer tubes than a good radio. No special skill is required for installation and operation. Stability and reliability are exceptional . . . and the cost is very moderate.

The "Utiliscope" is now in continuous use (24 hours a day) saving labor, improving product quality, preventing accidents and increasing production. Let us tell you about some of these installations that may suggest solutions to your own problems . . . write for Bulletin 1025.

TYPICAL USES— Studying destructive tests of engines • Watching flow of molten steel • Checking remote gauge readings • Observing conditions inside furnaces • Viewing nuclear research • Coordinating materials flow on conveyors.

The "Utiliscope" (Registered U.S. Patent Office)



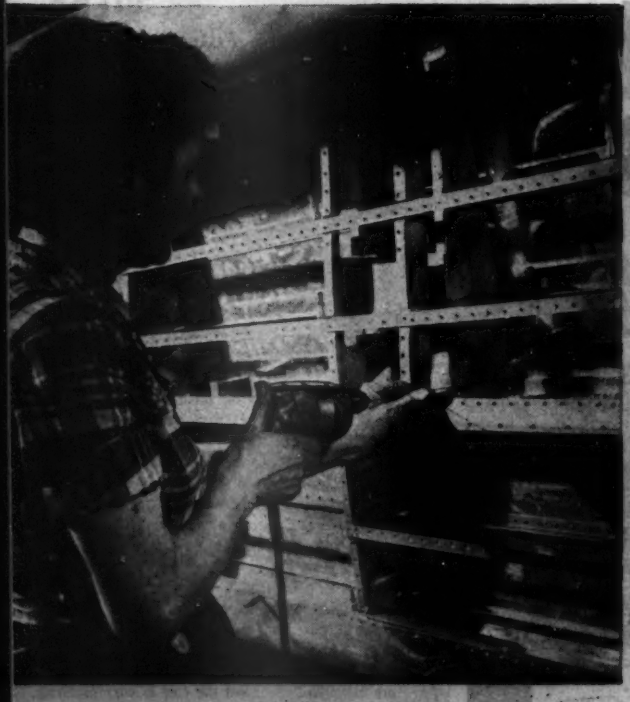
4938

DIAMOND POWER SPECIALTY CORP.
FIRST IN INDUSTRIAL TELEVISION
LANCASTER, OHIO • *OFFICES IN 39 PRINCIPAL CITIES*
Diamond Specialty Limited — Windsor, Ontario

WRITE FOR BULLETIN 1025

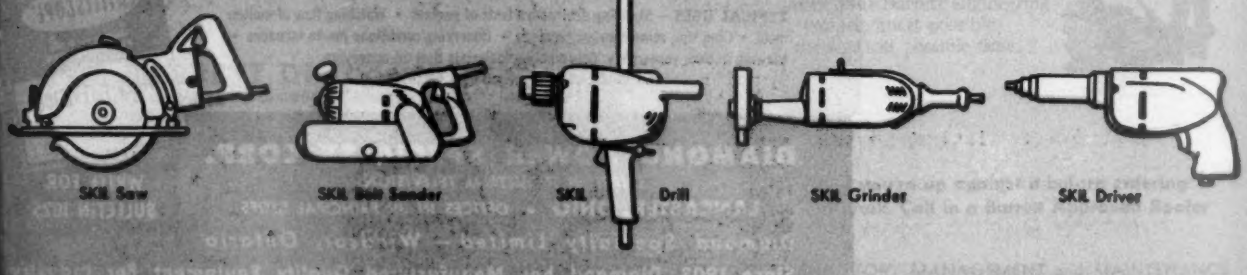
Since 1903, Diamond has Manufactured Quality Equipment For Industry

"We use only SKIL Drills, heavy duty, durable, yet compact, easy to handle!" . . .

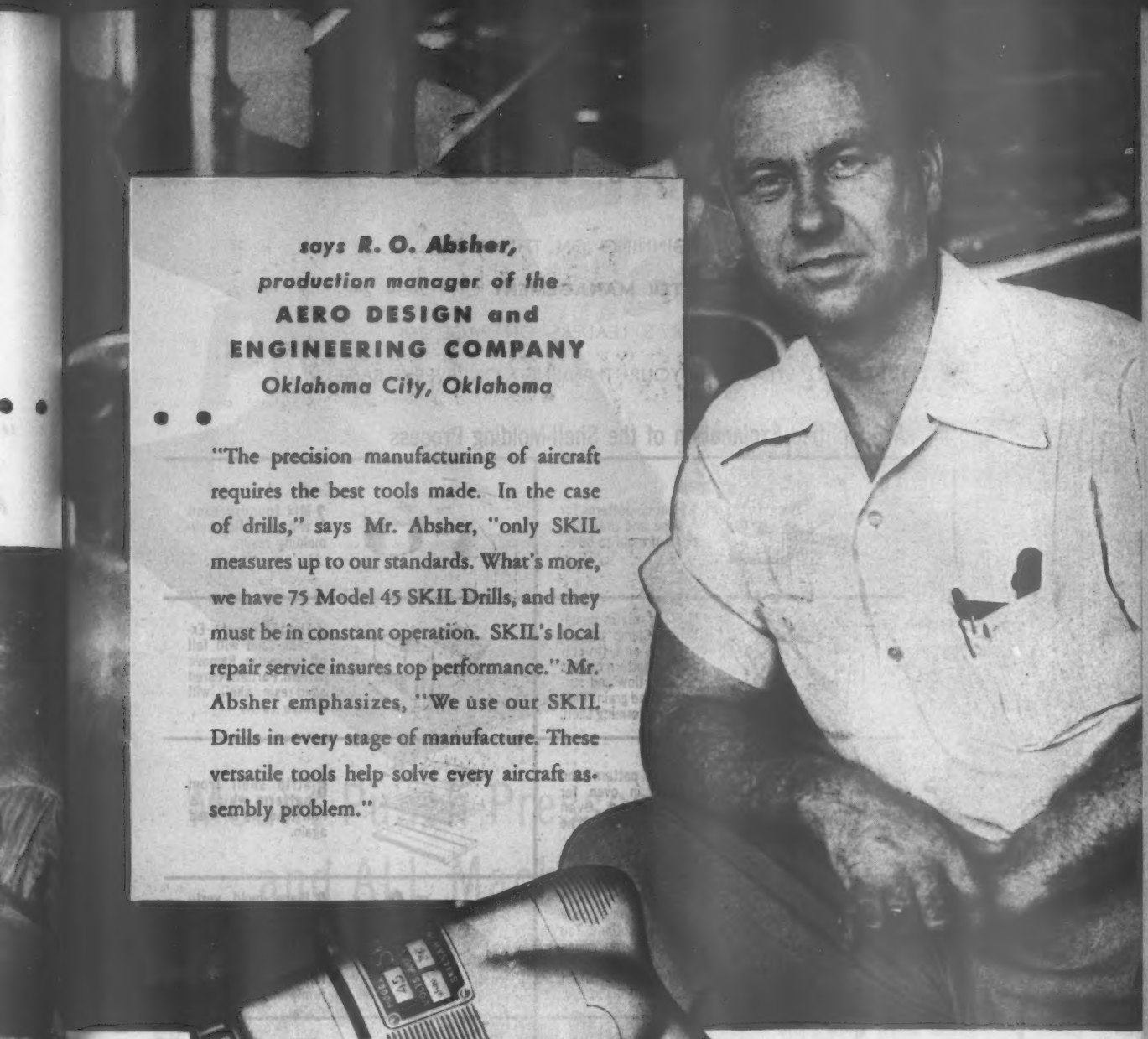


Lillie Pollock uses her Model 45 SKIL Drill with an extension bit in the process of fastening the aluminum skin to the ribs of a wing section. She says, "This SKIL Drill has a natural balance and is not tiring to use. SKIL ease of handling speeds work greatly."

R. H. McInturff, of this company, is using SKIL Drill Model 45 to drive a flexible shaft. This permits drilling in areas otherwise inaccessible. Mr. McInturff says, "This SKIL Drill is a convenient and heavy duty source of power for this drilling job."



SKIL Saw | SKIL Belt Sander | SKIL Drill | SKIL Grinder | SKIL Driver



says ***R. O. Absher,***
production manager of the
AERO DESIGN and ENGINEERING COMPANY
Oklahoma City, Oklahoma

"The precision manufacturing of aircraft requires the best tools made. In the case of drills," says Mr. Absher, "only SKIL measures up to our standards. What's more, we have 75 Model 45 SKIL Drills, and they must be in constant operation. SKIL's local repair service insures top performance." Mr. Absher emphasizes, "We use our SKIL Drills in every stage of manufacture. These versatile tools help solve every aircraft assembly problem."

SKIL Drill—Model 45
Compact ¼" drill. Capacity in steel: 0" to ¼"; in hardwood: 0" to ½". No-load speed: 1800 r.p.m. Overall length: 6⅝". Weight: 3 pounds.

There are 26 SKIL Drills . . . one for every need.

See Your SKIL Distributor for Demonstrations and Complete Information

SKIL
PORTABLE TOOLS

SKIL Products are made only by SKILSAW, Inc. 5033 Elston Avenue, Chicago 30, Ill.

SKILSAW Factory Branch Offices in 34 principal cities. In Canada: Skiltools, Ltd., 3601 Dundas Street West, Toronto 9, Ont.

YOU MUSTN'T MISS—

INDUSTRIAL NEWS, BEGINNING ON THIS PAGE

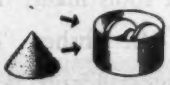
TIMELY HINTS TO BETTER MANAGEMENT ON PAGE 248

QUOTES FROM INDUSTRY'S LEADERS ON PAGE 254

IDEAS TO STIMULATE YOUR THINKING, ON EVERY PAGE

A Simplified Explanation of the Shell-Molding Process

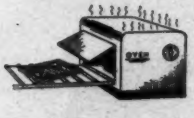
1 Heat up patterns for cope and drag sections of mold to 600F.



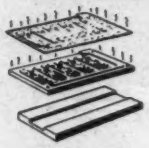
2 Mix foundry sand and phenolic shell-molding resin.

3 Place mix in dump-box. Clamp pattern on box and invert. Heat of pattern causes resin to flow and surround sand grains near pattern, forming shell.

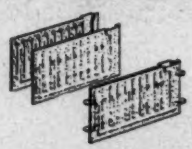
4 Flip box upright. Excess sand will fall off for re-use. Remove pattern. Partially cured sand-resin shell will adhere to it.



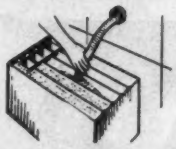
5 Place pattern and shell in oven for more curing. Oven temperature should be 600-1200F.



6 Strip shell from pattern, which is now ready to be used again.

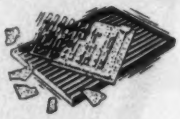


7 Align molded halves by matching cope and drag sections. You can use cured molds still hot or store them indefinitely for later use.



8 Place mold vertically in flask open only at top. Embed it in metal shot or sand to prevent swelling or finning. Support mold firmly in place.

9 Pour molten metal into vertical mold. Shell is permeable. Air and gas can escape freely from mold, leave no bubbles in casting.



10 When metal's cool, you can break mold away from casting. You'll find you need only a minimum of finish machining.

INDUSTRIAL NEWS

Recipe for Better Castings

EVER THINK OF PLASTIC SHELLS as foundry molds? That's the shell molding process—developed in Germany in the early 1940's and brought to America after the war. After several years of experimentation and limited use, it's now ready for wide industrial application. That's what the Borden Company says. It is one of the makers of shell-molding resins.

The 10 steps above show the highlights of the process. Advantages over other molding methods, according to Borden's: saves metal, cuts scrap losses and labor costs, and makes better castings. For more about it, write: The Borden Company, Chemical Division, Foundry Products Department, 350 Madison Avenue, New York 17.

Turn the page

Save Plant Floors... Protect Machinery

Bliss V&O Punch Presses and Federal Punch Presses mounted on UNISORB in the up-to-the-minute modern plant of Berger Manufacturing Company, Maspeth, Long Island, N. Y.

Mount Punch Presses— and ALL Machines the Modern Way...ON UNISORB®

Now your floors need never again suffer the scarring that goes with old-fashioned machine-mounting methods.

Because UNISORB-Mounting requires no bolts, no lag screws, you can say good-bye to destructive floor drilling forever.

What's more, UNISORB not only saves your floors from drilling, but it also saves them (as well as buildings) from much of the transmitted machine vibration. And, because UNISORB eliminates 60-85% of this vibration, it increases the life of the machinery itself, decreases the need for frequent maintenance and down-time.

We think you'll agree that *now's* the time for you to

LOOK FOR THE RED CENTER AND UNISORB BRAND MARK

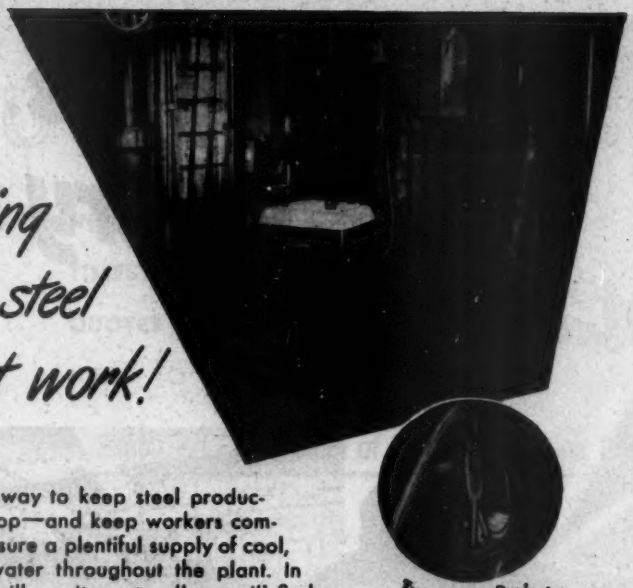
Write:

THE FELTERS COMPANY

210-A SOUTH STREET, BOSTON 11, MASSACHUSETTS

Offices: New York, Philadelphia, Chicago, Detroit, St. Louis
Sales Representative: San Francisco
Mills: Johnson City, New York; Millbury, Mass.; Jackson, Mich.

GET THE FACTS...ALL THE FACTS...ON UNISORB®—TODAY!



Making more steel is hot work!

There's one way to keep steel production at the top—and keep workers comfortable—insure a plentiful supply of cool, refreshing water throughout the plant. In most steel mills, quite naturally, you'll find Halsey Taylor Electric Coolers do the job—and do it better! Extra hygienic features, trouble-proof, economical!

Two-stream Projector with Automatic Stream Control

The Halsey W. Taylor Co., Warren, O.

HALSEY TAYLOR
COOLERS & FOUNTAINS

WHEN YOU'RE ASKED... *WHERE WERE YOU JAN. 14-17, 1952?*

BE SURE YOU'RE ABLE TO SAY... *AT THE THIRD PLANT MAINTENANCE SHOW & CONFERENCE IN PHILADELPHIA*

REMEMBER... this is the show for presidents, vice presidents, general managers, plant managers, plant engineers, maintenance engineers—and all other plant operating men whose responsibility it is to select, install, operate, and maintain the plant equipment and services that mean low-cost operation and high production.

SO... circle Jan. 14-17 today on your 1952 calendar ... write right now for rooms at your favorite Philadelphia hotel (for yourself and key people in your organization)... and mail this coupon →

CLAPP & POLIAK, Show Management
341 Madison Ave., New York 17, N.Y.
Please send ___ tickets for the Plant Maintenance Show.

NAME_____
TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE_____ STATE_____

FREE

YOU MUSTN'T MISS—

Begins on page 234

What Public Thinks of Businessman

If you're a businessman and you're worried that the public thinks you're selfish, you can relax — but not completely; there's still room for lots of improvement. According to a Psychological Barometer survey just made by the Psychological Corporation of New York, the public still thinks, as it did in 1949, that you're less selfish than union leaders and government officials. And what's more, of the 5000 adults asked which group was most selfish in America today, 6% fewer picked businessmen than in 1949.

Here's how the 1951 replies stack up, subtracting the 29% of "don't knows":

—27% named union leaders as the most selfish group.
—25% named government officials.
—11% named businessmen.
—5% named farmers.
—3% said "all of them."

Is Your Business Going in Cycles?

Men who study long-range variations in business cycles say that 1950 to 1960 will produce small numbers of business failures. What makes them say this? Well, there's a rhythm to economic history; you just have to find it, say the cycle students. They've charted business failures from the Civil War days to the present, and found that they form well-defined waves. The last wave reached its last crest in 1950, and is now due for a down-turn. And the down-turn in numbers of business failures, on the basis of the length of the last wave, is due to last 10 years.

Anyway, that's what Edward R. Dewey shows in the new *Journal of Cycle Research*.

Turn the page

Ruggedness of belts reinforced with "Cordura" rayon yarn is demonstrated by this giant chipper belt. As the chipper chews up huge logs, the belt takes repeated violent shocks. Belting reinforced with "Cordura" rayon lasts longer in this punishing service . . . yet costs no more.

5 times the expected service life from this belt

BECAUSE IT'S REINFORCED WITH "CORDURA" RAYON

They gave this belt eight months to live. It turns a giant machine that grinds big logs to tiny chips. Experience with ordinary belts in installations of this kind led engineers to believe the belt might fail in eight months or less. But it's already been in service more than three years . . . is still going strong.

What's different about this belt? Only one thing. It's reinforced with Du Pont Cordura* High Tenacity Rayon yarn. This yarn is inherently stronger than yarns of natural fibers commonly used . . . is made of continuous filaments with no short ends to pull apart under strain or shock load.

Moreover because the number of fibers and the diameter of each fiber are precisely controlled, there are no weak spots in "Cordura" yarn. It gives a drive belt exceptional strength, and makes it less subject to fatigue.

Wherever you use yarns or cordage in your business, there's a possibility the extra strength and dimensional stability of "Cordura" rayon can help you improve your product or process . . . *without increasing cost.*

*REG. U. S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

SEND FOR FREE BOOKLET "*Sinews for Industry.*" It gives physical properties of "Cordura" and tells how Du Pont will help you. Address: Rayon Division, Room 4421, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*Name*_____

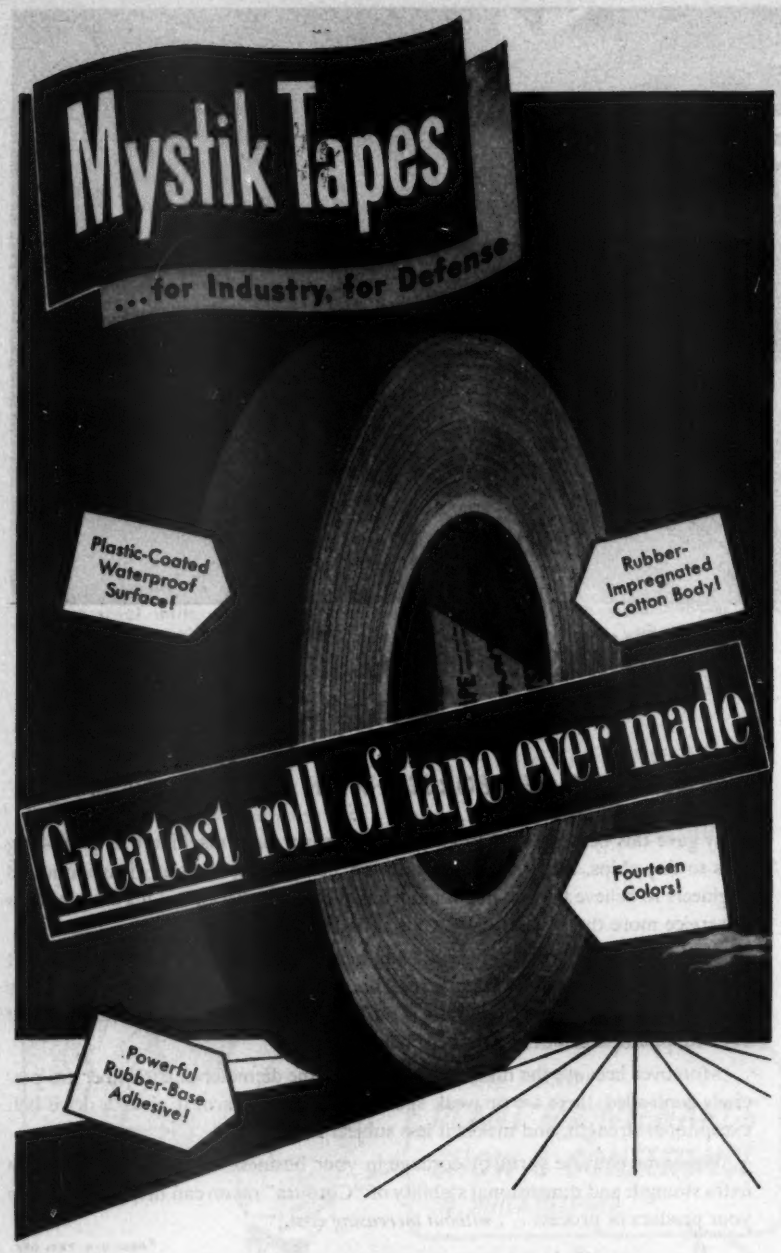
*Company*_____

*Address*_____

DU PONT
REG. U. S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

VISCOSE RAYON
NYLON
ORLON* acrylic fiber
ACELE* acetate rayon
DACRON* polyester fiber
*DU PONT TRADE MARKS

for fibers today . . . for fibers to come . . . look to Du Pont



- Mystik Cloth Tapes
- Mystik Paper Masking Tapes
- Mystik Protecto-Mask
- Mystik Dri-Pipe
- Mystik Spra-Mask
- Mystik Sand-blast

This roll of MYSTIK Tape (type 5800 C) leads the line of cloth tapes that supplied 65% of total needs of industry and the armed forces during World War II. Today, MYSTIK Tapes again are meeting the enormous protective shipping problems of military supply. Write for information and samples on the complete line of pressure-sensitive MYSTIK Tapes to meet every protective and production need. Mystik Adhesive Products, 2642 N. Kildare, Chicago 39.

YOU MUSTN'T MISS—

Begins on page 234

TOW YOUR PLANT HOSPITAL ANYWHERE, if disaster strikes. Trailer carries medical supplies.

Mobile Hospital for Plant Disasters

If disaster strikes, it may be easier to move the hospital to the patients than the patients to the hospital. That's the thinking behind a new hospital-on-wheels called the mobile medical disaster unit. The trailer sick-bay is a self-contained unit packed with complete emergency medical equipment. In case of trouble, just tow the hospital to the scene.

Here's what the unit includes:

—2 folding operating tables
—9 oxygen outlets
—automatic power generator for lighting
—60-gal. water storage tank
—electric hot water heater
—automatic switch over from dual oxygen tank supply
—built-in sink with hot and cold faucets
—storage battery for starting generator
—electric light outlets
—2 emergency stretchers
—storage space for supplies

The trailer measures 6½x10-x5½ feet and weighs about 1900 pounds. It's built on a steel-frame, heavy-duty combat chassis. The maker says it's well balanced for travel over rough ground. Attaches to car with a hitch that fits most bumpers.

Indian Trailer Corporation, Chicago, builds it.

Turn the page

CUTS COSTS

There are two ways to make more money: cut your costs—increase your sales. American Flexible Metal Hose and Seamless Flexible Metal Tubing have cut many manufacturers' product costs by simplifying assembly; have made many products more useful and more salable.

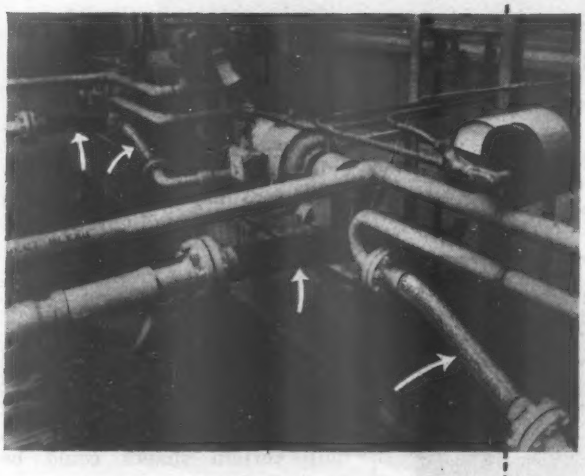
SELLS PRODUCTS

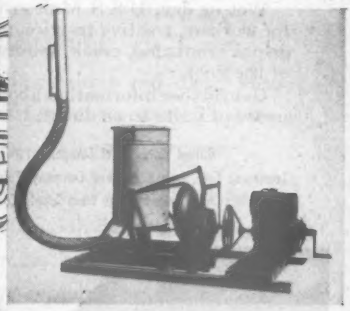
Investigate these versatile, strong, tight, flexible connectors for *your* product—for connecting piping or ports that move, vibrate or are out of alignment. There's a type for conveying liquids, gases, semisolids, chemicals and oils under severe conditions of temperature, pressure, corrosion and stress. Write now for Bulletins SS-50 and CC-300. The American Brass Company, American Metal Hose Branch, Waterbury 20, Connecticut. In Canada: The Canadian Fairbanks-Morse Company, Ltd.

51239

SPOUTS DEADLY DUST

American Lightweight Flexible Metal Hose directs the dust from this Simplex Orchard Duster of the Simplex Mfg. Co., McQueeney, Texas. Uniform flexibility for ease of handling, no complicated parts to break or get out of order and ease of detaching won the job for American Flexible Metal Hose.



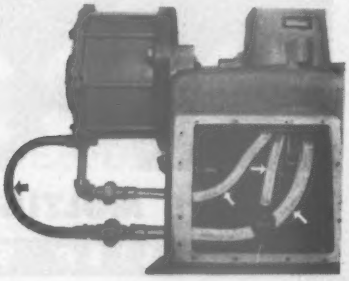


SOAKS UP SHOCKS

Four American Stainless Steel Flexible Tubing assemblies absorb shock from vaporization and hammer in suction and discharge of high-pressure pumps at Willow Island, W. Va., plant of American Cyanamid Co.

TIGHT SQUEEZE

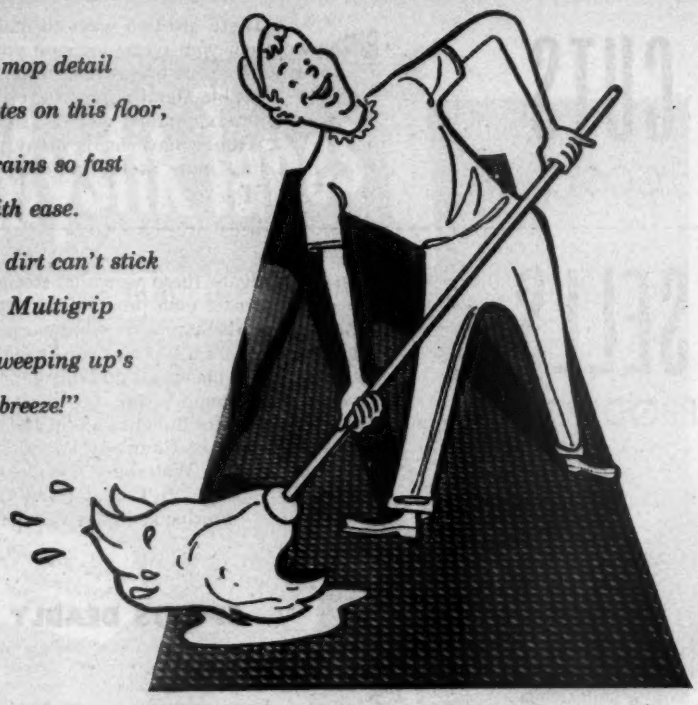
American Seamless Flexible Bronze Tubing saves a lot of time and money in making the compressed air connections on this tube beading and flaring machine. Note flexible tubing's workability in confined spaces.



WHEREVER CONNECTORS MUST MOVE... ANACONDA *American*

FLEXIBLE METAL HOSE AND TUBING

"The mop detail
dotes on this floor,
It drains so fast
with ease.
And dirt can't stick
on Multigrip
So sweeping up's
a breeze!"

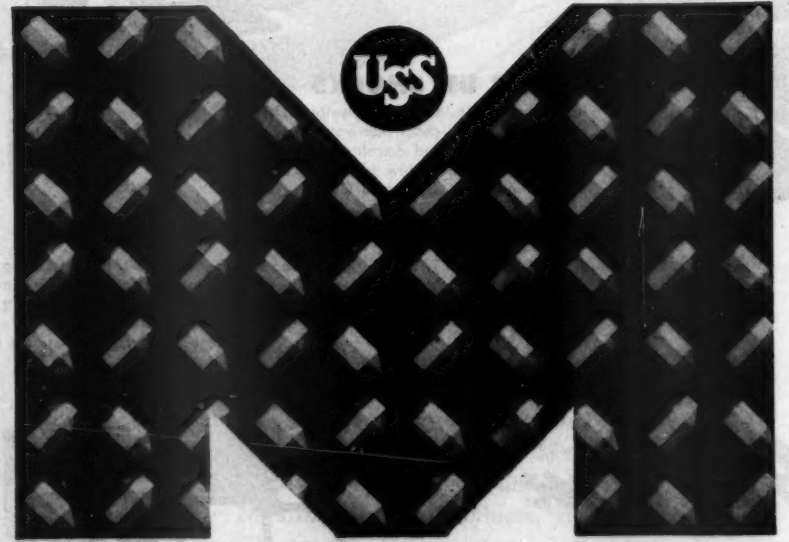


U·S·S MULTIGRIP FLOOR PLATE has no pockets in which dirt, grease and water can accumulate. All side faces of the lozenge-shaped risers are sloping so that dirt can be brushed or hosed away with ease. Drainage is complete and immediate in any direction.

Wet or dry, U·S·S Multigrip Floor Plate provides safe, sure footing for workers, positive traction for vehicles. And sturdy, *permanent* Multigrip will not chip, crack, splinter. Adds greatly to the structural strength of the floor.

Get further information about Multigrip from your nearest steel warehouse or write to us direct.

United States Steel Company, Pittsburgh · Columbia Steel Company, San Francisco
Tennessee Coal, Iron & Railroad Company, Fairfield, Ala. · United States Steel Export Company, New York
United States Steel Supply Company, Warehouse Distributors, Coast-to-Coast



U·S·S MULTIGRIP FLOOR PLATE 1-1145

UNITED STATES STEEL

YOU MUSTN'T MISS—

Begins on page 234

Cold Steel Squirted Into Many Shapes

Many objects formerly made by hot forging can now be produced faster, cheaper, and stronger by "Koldflo," a new process for squirting cold steel into desired shapes. This so-called cold-extrusion process for steel is practicable for wide areas of industry. Former methods were used mainly in munitions making.

Mullins Manufacturing Company, Warren, Ohio, developed the process. And the Hi-Pac Corporation, Hillside, N. J., is the first licensee.

Koldflo cuts costs · Hi-Pac says that the new process:

1. Has lopped a third off the cost of conventional machining.
2. Has cut the number of operations in half.
3. May eventually make possible a doubling of production.

How it works · According to Mullins, Koldflo transforms small cylindrical steel billets—the type used for hot forgings — into formed parts using hydraulic and mechanical presses and lubricants common to industry. What were the limitations of previous methods of cold extrusion? Toughness of steel had required special presses and lubricants to form parts by squeezing cold steel into dies. And even then only certain shapes could be made that way.

Mullins will continue licensing product manufacturers in the engineering and die designing of Koldflo. It can produce such objects as shock absorber cylinders, gear blanks, pulley hubs, bearing housings, etc.

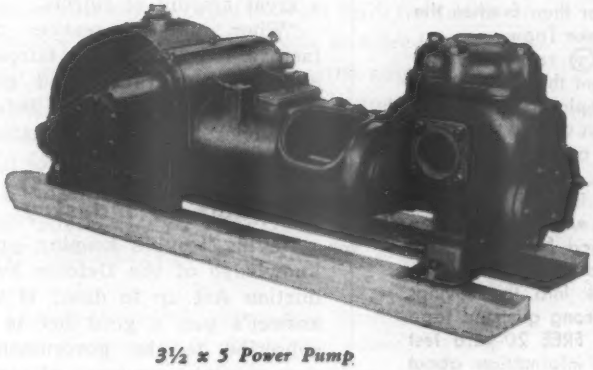
Advantages of Koldflo · Here are the advantages Mullins sees in this new way to shape steel:

• Scrap is eliminated. Only enough metal for the formed part is needed.

Turn the page

2-Way Economy with GARDNER-DENVER Boiler Feed Pumps

5¼ x 3½ x 5 Steam Pump



3½ x 5 Power Pump

1. POWER ECONOMY! Gardner-Denver Steam Pumps have short and direct steam ports for greatest steam economy. The steam valves stay tight at all steam pressures.

Gardner-Denver Power Pumps are equipped with friction-defying Timken tapered roller main bearings. Herringbone gears and large eccentric bearings transmit more of the power into useful pumping.

2. IN THE SIZE YOU NEED! Gardner-Denver Boiler Feed Pumps are manufactured in a wide range of sizes, for any type of drive. Our pumping experts will gladly help you select just the right combination for maximum economy in your plant.

Write us today for further information.

SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada:
Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

2 strips are stronger than 6

. . . when the 2 are

Angier Reinforced SNAKE TAPE

It's so strong that you will wipe out all damage claims due to tape failure . . . and you will make up to

⅔ saving on sealing labor!

These are proven savings being made now by leading mail order houses, publishing firms, food companies, metal-working plants, and many other enthusiastic users of Angier SNAKE TAPE.

Rigorous independent lab tests exceeding all abuses of actual shipping conditions prove that 2 strips are stronger than 6 when the 2 are Angier Snake Tape.

Sturdy cords (1) *reinforce* packages to the extent that steel strapping is often replaced by Snake Tape. Two layers of select kraft (2) are bonded with asphalt (3) to make a waterproofed closure. The best animal glue (4) is used to give a *sure* seal. This extra strong tape is easily dispensed by almost any "cut-off" type machine.

Why not look into the savings that this extra strong gummed tape offers you? For FREE 20-yard test roll and more information about Snake Tape, write now to:

Angier Corporation
Framingham 1, Massachusetts

So strong, it often subs for steel strap!

Angier

Industrial Protective Papers—Since 1895

YOU MUSTN'T MISS—

Begins on page 234

- Weight and size tolerances can be held for most mass production precision parts.
- Objects have a glass-smooth surface that does not require expensive finishing.
- Less labor is needed in forming operations.
- Parts are stronger than can be formed by hot working of steel. With some products, heat treating can be eliminated, and steel alloys containing less hard-to-get manganese, chrome, and nickel can be used.
- Process is versatile enough to coin, extrude forward and backward, compress, expand, and flatten steel.

Red Tape Behind Iron Curtain

There are indications that industrial life behind the Iron Curtain is not so happy this year. Here are some excerpts from a Hungarian newspaper story on a machine factory:

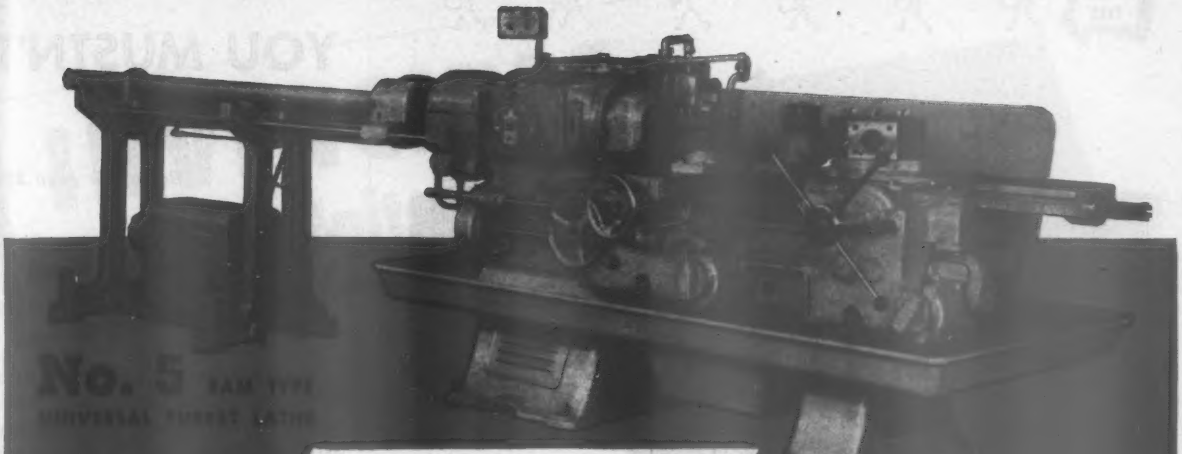
"Forging, factory, metal foundry, and steel works all deliver a great amount of rejects. . . .

"When material reaches our factory, it passes to the bureaucratic administration and goes through at least 15 hands before it reaches the workbenches."

Defense Order Digest Available to Industry

Having trouble keeping your knowledge of the Defense Production Act up to date? If the answer's *yes*, a good bet is to subscribe to the government's new monthly summary of regulations, orders, amendments, supplements, and forms issued by all mobilization agencies. You can get the publication—called *Abstracts of Defense Regulations Issued Pursuant to the Defense Production Act*—from the Superintendent of Documents, Washington 25, D. C., for $6 a year.

Turn the page



Built & Powered to Produce

MORE CHIPS PER TOOL
MORE PIECES PER HOUR
MORE PROFIT PER JOB

than any other turret lathe of comparable size

Jones & Lamson offers the best investment in turret lathes. They are backed by the "know how" of a firm, long predominant in the field, whose many pioneered and perfected developments have brought about far-reaching advances in the art of cutting metal.

Every feature of these lathes has been developed through long-range research and practical experience in production turning. Their superior performance stands out over any other machine of comparable size, because they are built to hold their accuracy at the highest speeds and feeds possible with modern cutting tools — with ample reserves to anticipate new cutting techniques. Jones & Lamson Turret Lathes have a well-earned reputation for ease of operation, low operating costs and year-round dependability. They are recognized for their advantages in *SPEED, POWER, RIGIDITY AND REPETITIVE ACCURACY.*

They will pay for themselves quickly through savings in direct costs alone!

- Single lever speed selector — 12 spindle speeds 30 to 1500 RPM or 20 to 1000 RPM
- 15 HP constant speed motor — ample horsepower available at all speeds
- Single lever carriage feed selector — 9 reversible longitudinal and 9 cross feeds
- Single lever hexagon turret feed selector — 9 longitudinal turret feeds
- All longitudinal and cross feeds automatically disengaged against positive stops
- Heavy-duty spindle mounting with rugged preloaded anti-friction bearings
- Heat-treated, precision-finished, long-wearing alloy steel gears
- Multiple-disc type forward and reverse clutches — automatic spindle brake
- Husky, multiple-spline transmission shafts with anti-friction bearings
- Hardened and precision ground steel ways — 12½" in overall width
- Bridge-type carriage for multiple tooling at rear of cross slide
- 4-position, quick-indexing square turret — all faces tapped for extra tool blocks
- Hexagon turret clamped automatically on forward stroke of ram
- Automatic lubrication system with forced feed to all sliding bearings
- Complete coolant system — automatic internal delivery to each hexagon turret face
- Adjustable graduated handwheel dials and clips and chrome plated handwheels, dials and levers

Write to Dept. 710 for Complete Information

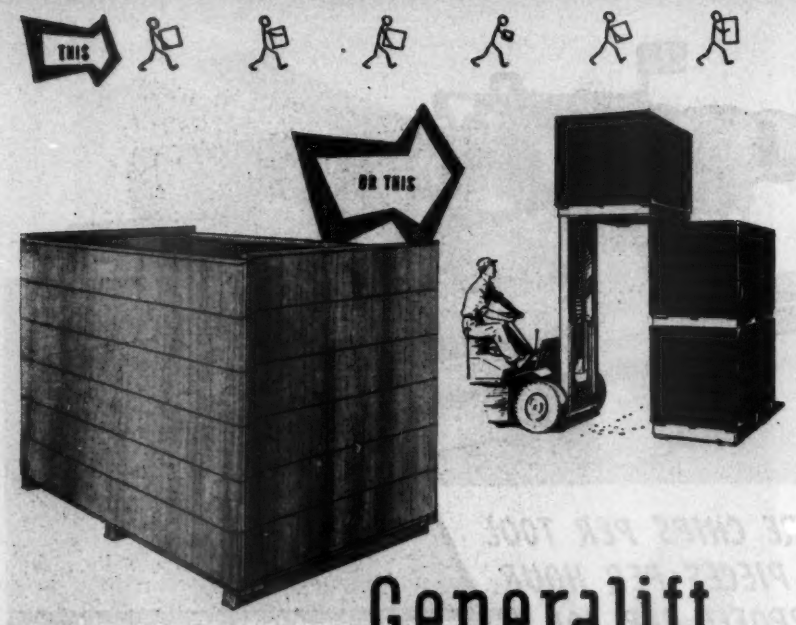
Turret Lathe Division

JONES & LAMSON

MACHINE COMPANY

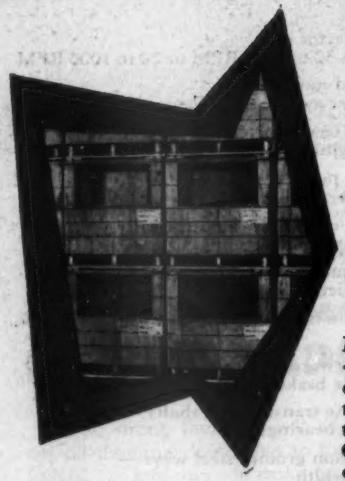
Springfield, Vermont, U.S.A.

MACHINE TOOL CRAFTSMEN SINCE 1835



Generalift ★★★★★

pallet boxes



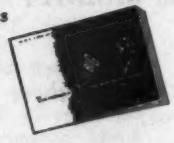
1 CUT MATERIALS HANDLING COSTS

2 SHARPLY REDUCE STORAGE COSTS

More and more cost-minded manufacturers —the country over—are saving with Generalift Pallet Boxes. These versatile containers sharply reduce costs wherever materials are handled or stored. Remember, Generalift Pallet Boxes and fork-lift truck do the work of many employees. And remember also to write us for complete information. Why not do it NOW?

WE WILL MAIL FREE COPY OF "THE GENERAL BOX"

This colorful booklet illustrates and describes the many advantages of the Generalift Pallet Box. We will be glad to mail upon request.



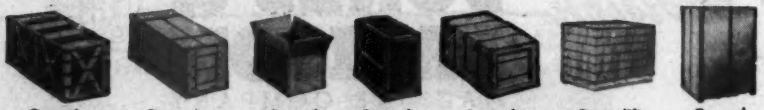
ALL TYPES OF ENGINEERED SHIPPING CONTAINERS

DISTRICT OFFICES AND PLANTS: Cincinnati, Denville, N. J., Detroit, East St. Louis, Kansas City, Louisville, Milwaukee, Sheboygan, Winchendon, Continental Box Company, Inc.: Houston, Dallas. General Box Company of Mississippi, Meridian, Miss.

General BOX COMPANY

engineered shipping containers

GENERAL OFFICES: 504 N. Dearborn St., Chicago 10, Ill.



General Wirebound Crate | General Nailed Box | General Corrugated Box | General Cleated Corrugated Container | General All-Round Box | Generalift Pallet and Pallet Box | General Watkins-Type Box

YOU MUSTN'T MISS—

Begins on page 234

Aid To Europe Is Big Question Ahead

(By McGraw-Hill Department of Economics)

Mobilization in Europe thus far has produced mainly economic problems — not military strength. And the U. S. cannot help being drawn into them.

The defense effort has renewed rapid inflation in Europe and drained off much of the nation's limited gold and dollar reserves. But it has put only about another 300,000 men in uniform, and production of weapons for them has hardly begun.

Crux of the problem • Europe's problems center around industrial production. The countries have boosted their production about 10% since Korea. But they can't meet the demand for weapons by raising production again because of steel and coal shortages. And governments feel they can't shift from civilian production to military. That would lower living standards—and give Communist parties an opening.

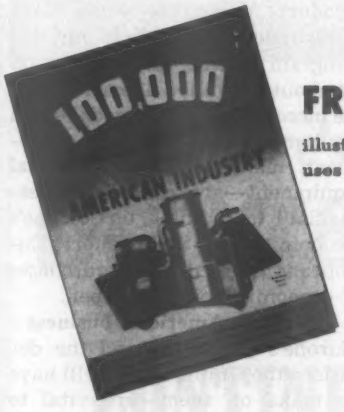
Decision up to Congress • With our own mobilization effort expected to be creating a sizable government deficit next year, Congress will have to decide by Spring how much the United States should do in bolstering Europe. This year's $7.5-billion foreign aid program is being approved only after long and intense debate. Next year the pressure to cut aid drastically will be much greater.

Europe clearly can't go it alone • We have already promised to help out on coal, steel, and machine tools. We have coal, but filling Europe's requirements would take the full-time service of more than 500 Liberty ships—and shipping is tight. We have promised the British 3-million tons of steel next year, but in-

INVINCIBLE Vacuum Units Reclaim....

bolts
broken glass
carbon black
chemicals
coal dust
coffee
cotter pins
core sand
cork
crushed stone
dirt
explosives
fabricated parts
fertilizer
flour
fly ash
fly lint
frit
gold
grains
grindings
lead
liquids
metal dusts
nuts
paper dust
plastics
powder
oils
ravelings
rivets
sand
sawdust
silica dust
soap
shot
silver
soapstone
soot
spices
starch
sugar
talc
water

These are only some of the materials successfully handled by Invincibles—by recovering or reclaiming almost anything that will pass through a vacuum hose, they quickly repay their costs... **Invincibles also serve as vacuum cleaners, keeping plants clean, safe and more productive by removing all industrial dust and dirt... Over 100,000 Invincibles are in use—5,000 for over 25 years. Let Invincible engineers apply their more than 40 years of experience to your reclaiming or cleaning problem.**



FREE BOOKLET

illustrates valuable industrial uses of Invincible Vacuum Units. *Ask for it!*

Model 809-B—an extra-heavy duty unit (5 HP). Other models from ½ HP up.

INVINCIBLE VACUUM CLEANER MFG. CO.
DOVER, OHIO
40 YEARS; LEADERS IN INDUSTRIAL VACUUM EQUIPMENT

New... PRESS CONVEYOR

Now get greater flexibility in this new PORTABLE press conveyor. Adjusts quickly to desired angles. It is well balanced . . . easy to maneuver. This new portable press conveyor is designed to keep stampings and scrap on the move at lowest cost. Write today for all the facts.

ADJUSTS from horizontal to a 65° incline.

Model 96 - 6 ft. size
Model 98 - 8 ft. size

FREE — Illustrated Folder Just Off The Press. Write to . . .

CONVEYOR SPECIALTY COMPANY, INC.
32 Newport Avenue, North Quincy 71, Mass.

Belt Conveyors • Slat Conveyors • Gravity Conveyors • Reciprocating Lifts • "Unitable-" Belt Conveyor • Unipac Handler (Portable Piler) • Complete Package Handling Systems

SPECIFY STRONGER SAFER "HERCULES" FLATTENED STRAND

- 10% extra strength.
- Larger metallic area.
- Smooth wearing.
- Smooth running.
- Easier to rig.
- Extra safety
- Extra economy.
- RED-STRAND quality

SPREADS THE LOAD
FOUR WAYS

"Hercules" Flattened Strand design spreads wear over four wires — not just one. This compact outer surface greatly reduces wear in grooves . . . helps keep them smooth. Triangular cross-section of strands permits smaller core, larger contact area between strands, and greater resistance to crushing. "Hercules" Flattened Strand Wire Rope offers greater strength and economy.

LESCHEN WIRE ROPE

Consult our Engineering Department for specific recommendations. A. LESCHEN & SONS ROPE CO., 5909 Kennerly Ave., St. Louis 12, Missouri. Distributors in all principal cities.

YOU MUSTN'T MISS—

Begins on page 234

dustry here is scrambling for steel. And machine tools are one of the tightest items in America.

Europe must produce • Washington leaders — including key Congressmen—fear that American aid may go right down the rat hole unless Europe substantially increases its own effort. Administration leaders in Congress think we have about reached the limit on raising taxes—that foreign aid is one of the most expendable government projects. Next year, with a presidential election in November, the whole foreign aid program will have to be justified at the ballot box. So unless the Europeans come up with dramatic results in their rearmament effort there may be few legislators willing to vote another $7-billion or $8-billion aid program for 1953.

Will they want American products? • The big questions about overseas markets for American products will come when Congress decides whether our aid program will be cut, will run on at about $7-billion a year, or will be increased. Capital goods—farm equipment, construction equipment, many kinds of industrial equipment—are considered "essential" to building up Europe's economy. But dollar-short Europeans may cut back purchases if economic troubles deepen.

Effect on American business • Europe's problems—and the decisions the United States will have to make on them—are vital to American business. Our export markets and the flow of imports to this country will be affected greatly by the way the problems are met. And it is American business—particularly the industries producing steel, coal, and heavy industrial equipment—that will feel the direct impact of Congressional decisions.

Turn the page

HIGH-VOLTAGE SWITCHGEAR FEATURES

- New—less floor space but more room for instruments, relays, transformers, buses, etc.
- Welded-in floor plates simplify foundation requirements, provide easy breaker handling.
- Wide guide rails in breaker compartments add rigidity and protect wiring.
- Looped wiring minimizes wear at points where flexing occurs.
- Horizontal contact separation of *Ruptair* circuit breakers adds thermal assist to magnetic arc interruption.

LOW-VOLTAGE SWITCHGEAR FEATURES

- Safe dead-front, compartmentalized construction, with entire structure grounded.
- Rigid construction of framework assured by jig-welding and lap joints.
- Breakers of same rating are interchangeable. Pantograph mounting makes circuit breaker withdrawal easy.
- Circuit breakers can be tested within switchgear unit for added convenience.
- Individual, enclosed, wall-mounted breakers available for locations where needed.

Here's *Insurance* for CONTINUOUS PRODUCTION

YOUR accountants can tell you exactly how much your plant and equipment is worth. But productive use of that investment is becoming increasingly dependent on electrical power, and modern switchgear is essential to the efficient, continuous distribution of that power within your plant.

Allis-Chalmers switchgear can help you maintain full production . . . on schedule. Since this equipment is standardized, new units can readily be incorporated if your requirements change during the years ahead. Servicing is cut to a minimum and is quick, easy and safe because design features and engineering details are dictated by operating and maintenance experience.

Some of the features are listed above. More details are given in Bulletin 18B6185. Why not ask your A-C representative for a copy, or write to Allis-Chalmers, Milwaukee 1, Wisconsin. A-3523

Ruptair is an Allis-Chalmers trademark.

ALLIS-CHALMERS

FIRST IN THE U. S. WITH METAL-CLAD SWITCHGEAR

This Safety Tread IS CAST TO LAST

it's FERALUN

A special cast iron matrix with a diamond-hard abrasive imbedded in the walking surface. That's the Feralun secret of safety. The abrasive, *not* the scoring, provides secure footing—wet, oily or dry. ● That's why you will find Feralun underfoot, wherever traffic is heaviest. For over a quarter of a century, millions of feet of Feralun treads, floor plates and thresholds have been used in subways, railway cars, buses, factories, office and public buildings, even on battleships. This extra-safe, extra-durable flooring will last the life of the structure. Don't slip up on safety! Look into the facts and figures on Feralun.

Write today for **BULLETIN** 4k Am

AB 109

AMERICAN ABRASIVE Safety Floorings

AMERICAN ABRASIVE METALS CO.
460 COIT STREET, IRVINGTON 11, NEW JERSEY

YOU MUSTN'T MISS—

Begins on page 234

TIMELY HINTS

Building Safety Into Your Plant

Did you know that about 40% of all industrial accidents can be traced to some defect in plant layout or materials handling? What can you do about it? Well, you can help cut the figure by building safety into your plant. See how your plant stacks up against this list prepared by R. W. Mallick, staff engineer with Westinghouse Electric Corporation:

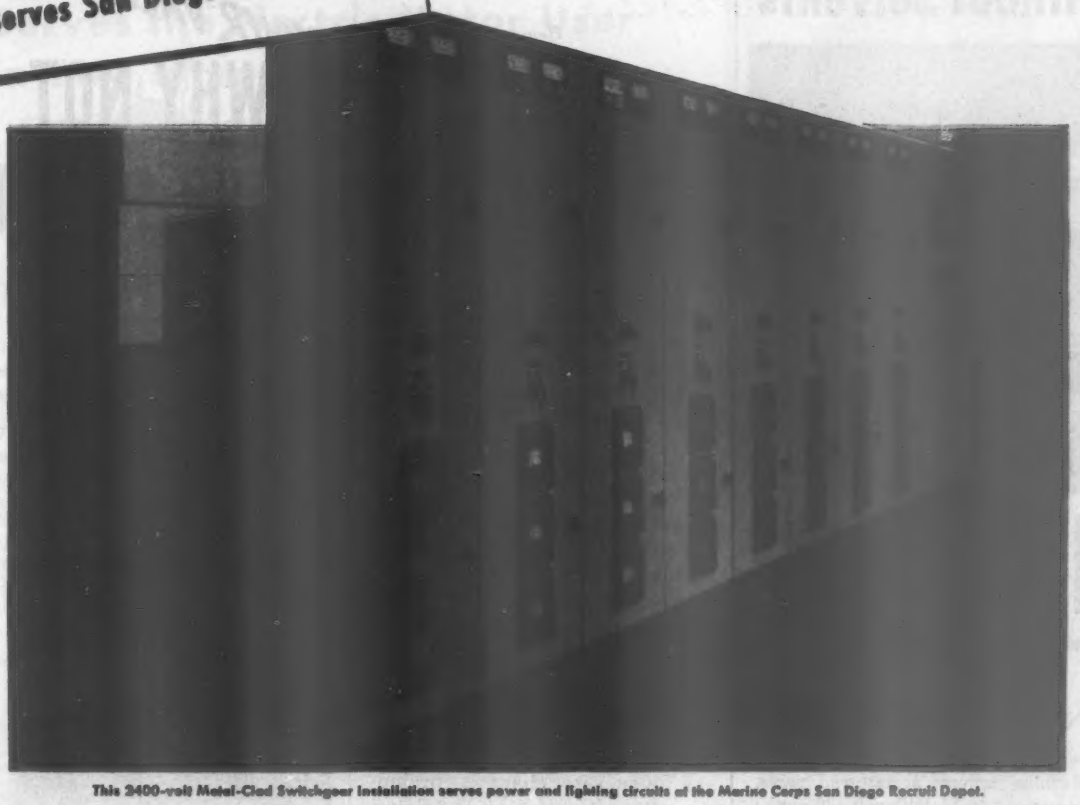
Plant site • Provide adequate approaches and parking facilities, institute one-way traffic on plant grounds, provide shelter for employees who wait for buses. Separate rail, highway truck, industrial truck, and pedestrian traffic. Avoid hazards such as sharp turns, grades, and blind spots. Provide adequate shipping and receiving facilities segregated from traffic within the plant.

Walkways • Keep them generously wide, well lighted, and as straight as possible. Use one-way traffic if possible on all walkways. Try to eliminate stairs where possible. If you can't, provide handrails and non-skid step surfaces. If located outside, design them for quick cleaning. Keep floors free from tripping hazards. Provide proper drainage.

General information • It's a good idea to check with a safety engineer to see if you have adequate fire and explosion protection, and if your first aid facilities are up to par. Finally, you ought to make sure your housekeeping is in good order.

Turn the page

Westinghouse Switchgear serves San Diego Marine Base



This 2400-volt Metal-Clad Switchgear installation serves power and lighting circuits at the Marine Corps San Diego Recruit Depot.

"...Its design eliminates operating hazards!"

This new Westinghouse Switchgear installation points up many advantages of replacing obsolete protective equipment with modern switchgear.

"... Because its design eliminates operating hazards, the new equipment provides a big margin of safety over the old installation. Safety interlocks and complete isolation of live parts make switching, circuit testing, and breaker exchange as safe as turning on the lights.

"Lower over-all cost is anticipated also. Complete factory assembly and testing of the unit have resulted in substantially reduced installed cost ... and its standardized design provides ample flexibility for low-cost expansion or conversion of the depot's power system."

This is how Ets-Hokin & Galvan, Electrical Contractors on this job, sum up this Westinghouse Metal-Clad Switchgear. And they cover only a few of the benefits this modern equipment offers to *you*.

For complete information write for Booklet B-4016. Address: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-60757

METAL-CLAD SWITCHGEAR

NOW CLEAN GENERATORS MOTORS Without Solvents

NO Drying Period Toxic Hazards

with New Pangborn AC-4 Blast Machine

NOW YOU CAN clean electric motors, generators and turbines *without solvents!* The new Pangborn AC-4 Blast Machine scours armatures, parts, frames, coils, etc. with soft (20-mesh) corncob grits.

Since no liquids are used there is no need for drying periods and toxic or explosive hazards are eliminated. Large equipment can be cleaned *in place* and no residue is left to create gum or to break down insulation.

Simple and Inexpensive

New Pangborn AC-4 Blast Machines operate from a standard 40-pound air supply. Material costs average 1/10 of other methods and complete cleaning is finished in half the time.

FOR DETAILS, write today outlining your operation. Address: PANGBORN CORPORATION, 2100 Pangborn Blvd., Hagerstown, Maryland.

Look to Pangborn for the Latest Developments in Blast Cleaning and Dust Control Equipment

Pangborn

BLAST CLEANS CHEAPER with the right equipment for every job

YOU MUSTN'T MISS—

Begins on page 234

Foremen's Paychecks Up 11.6% Over 1949

Mr. Average Foreman in the Cleveland area has upped his monthly paycheck 11.6% — to $426.97—since 1949. So says Associated Industries of Cleveland in a survey of 1923 foremen in plant's employing more than 25% of the area's industrial workers.

Wage range · From $250 a month for a new foreman supervising one or two unskilled workers to $800 for the foreman of a major department.

The survey describes foremen according to the jobs they do:

Foreman "A" · He's a top man in his field, whether he supervises diversified manufacture of services or supervises a major department of a company. Management gives him only general instructions, leaves the details up to him. He's in charge of an average of 79 employees, and has the say over rate changes, promotions, transfers, hiring and firing. Weighted average monthly wage: $540.31.

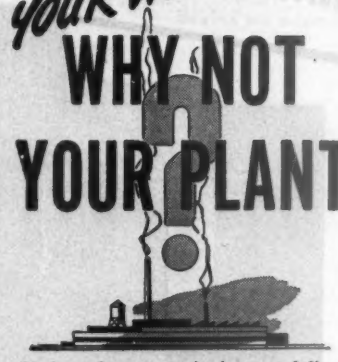
Foreman "B" · He supervises a minor department or is left in charge of manufacture or services which are repetitive, but complex. He's boss of an average of 38 employees and handles rate changes, promotions, and the like. But his decisions are subject to the approval of upper management. Weighted average wage: $438.84 a month.

Foreman "C" · He has the least authority, and gets the lowest wage. He's a "front-line" supervisor of an average of 22 workers doing simple operations in manufacture or performing services. He's under the constant watch of management, and has nothing to do with hiring, although he does train workers. Weighted average monthly wage: $371.22.

Turn the page

YOU SAFEGUARD YOUR VALUABLES

WHY NOT YOUR PLANT



Unfenced property invites vandalism and sabotage. Don't take chances in these dangerous days. Fence NOW and be safe. Surround your property with a Stewart Non-Climbable Chain Link Wire Fence. Also available for protective measures are Stewart Wire Window Guards, Steel Folding Gates, Wire Mesh Partitions and other products. Catalog No. 85, which contains complete information, will be sent on request.

Stewart 3TH Chain Link Wire Fence. Also available in 5TH (5 strands of barbed wire).

STEWART WIRE MESH PARTITIONS

Sectional with standard panels. May be arranged to fit any space. Ideal for locker rooms, toolrooms, storage rooms.

Other Stewart Products: Iron Picket Fence and Gates; Iron and Wire Window Guards; Sliding and Folding Steel Gates; Iron Railings; Steel Settees; Skylight and Machinery Guards; Bronze Plaques, and many others. When writing for information, please mention products in which you are especially interested.

Stewart maintains sales and erection service in all principal cities.

THE STEWART IRON WORKS CO., INC.

Stanley M. Stewart, President

1856 Stewart Block, Cincinnati 1, Ohio

"Fence Builders to America Since 1886"

Stewart IRON and WIRE FENCES

Century

Serves the Electric Motor User in Two Important Ways:

1. Century motors are designed and constructed for a long, dependable operating life.

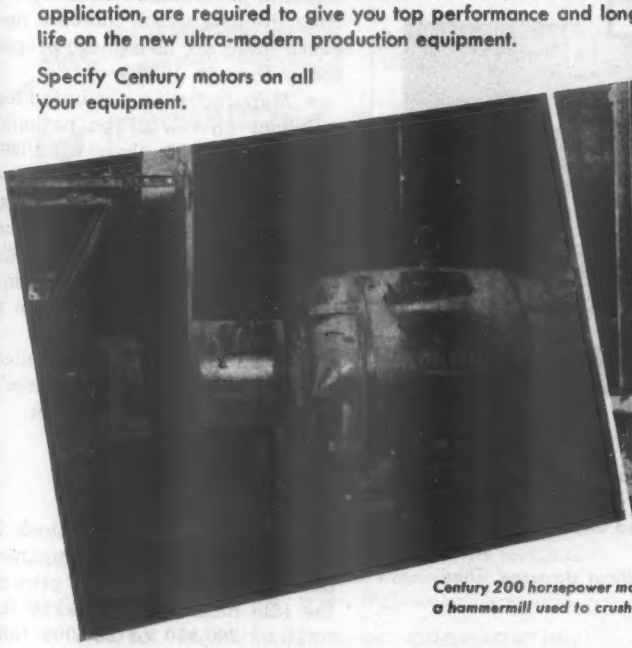
2. Just as important—they are skillfully selected to match the operating characteristics of the many kinds of equipment they drive.

IN CENTURY'S wide range of types and sizes (up to 400 H.P.) there are available: 4 standard classes of starting torque characteristics—6 methods of speed control—constant and short time ratings—4 basic classes of frame protection against atmospheric hazards—a dozen methods of mounting the motor to the equipment—plus many special specifications to meet the requirements of the BIG NAME equipment manufacturers who use Century motors as a component part of their equipment.

Teamwork with equipment producers gives you skillfully selected motors from Century's wide range of types and sizes . . . properly applied to match the performance characteristics of the machines they drive.

Both a properly designed and constructed motor, plus skillful application, are required to give you top performance and long life on the new ultra-modern production equipment.

Specify Century motors on all your equipment.



Century 200 horsepower motor driving a hammermill used to crush feed.

Century 5 horsepower totally enclosed fan cooled motor drives a mixer in a processing plant.

Century Electric Company is celebrating its 50th year in the electrical industry

CENTURY ELECTRIC CO.

1806 Pine St. • St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

Century SERVICE Is Near Any CENTURY Motor Driven Equipment

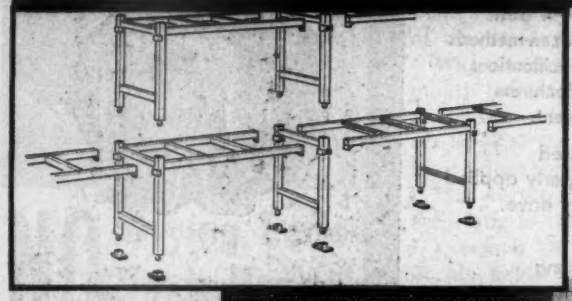
Prompt Service is offered by CENTURY'S National Network of more than 200 Authorized Service Stations, supervised by 28 Century Sales offices.

1. Facilities for immediate exchange of most CENTURY standard ratings of standard construction are available at CENTURY Authorized Service Stations.
2. CENTURY Authorized Service Stations are qualified and equipped to service and repair any piece of CENTURY apparatus.
3. Genuine CENTURY renewal parts are available at CENTURY Service Stations, CENTURY Parts Distributors and at the factory in St. Louis.

Century C MOTORS

709

Keep your Storage Area Flexible with MHS COLLAPSIBLE PALLET RACKS



Method of assembling a bank of MHS Collapsible Pallet Storage Racks

MHS Collapsible Pallet Storage Racks in a warehouse

You can set up MHS Collapsible Pallet Storage Racks easily and quickly anywhere in the plant or warehouse. It takes only two men and they needn't be skilled.

You can add any number of units longitudinally and one or more tiers vertically at any time.

You can move these racks from place to place without damage. They never become obsolete.

Write for prices and specifications.

Mechanical Handling Systems, Inc.

4600 NANCY AVE. • DETROIT 12, MICH.

Offices in Principal Cities

In Canada: Canadian Mechanical Handling Systems, Ltd.

YOU MUSTN'T MISS—

Begins on page 234

Great Expansion in Industry Since '29

No one doubts that the U. S. industrial economy has been expanding over the past two decades, but few could tell you just how much. Here are some answers, in terms of 1929 dollars to adjust for inflation.

- In 1950 the U. S. turned out $1229 worth of goods and services per person, compared with $852 per person in 1929—a production boost of 44% per person.
- In total, the output of goods and services was $186.5-billion compared to $103.8-billion in 1929. This is an 80% rise. (The national percentage rise is higher than the per-person increase because there are 25% more people today than in 1929.)
- Manufacturing accounted for a bigger chunk of the national income in 1950 than in 1929. Back in '29, just 30% of non-agricultural income came from manufacturing industries. The 1950 figure jumped to 37.5%. Reason: the growing use of complex durable goods that take a lot of fabricating.

The information was supplied by the Department of Commerce's Office of Business Economics.

Scraps . . . From All Over

Although the scrap outlook is still bleak, several companies have collected impressive piles of the idle metal. Of the asked-for total of 200,000 to 300,000 tons of industrial scrap this year:

—E. I. duPont de Nemours & Company turned up 25,000 tons.

—General Motors Corporation contributed almost 9500 tons, all in addition to the usual scrap regularly returned to the mills.

Cash in your Scrap!

Turn the page

SLEEVOIL

—the super-quality fan bearing for mechanized draft installations!

● Hundreds of generating plants in America run on Dodge Sleevoil Bearings. These famous bearings combine quietness, long life and dependability to a degree unique in the bearing field. They offer engineers of costly power plants a priceless safeguard for their equipment.

Sleevoil Bearings are a Dodge development—created especially to meet the exacting requirements of fan and blower service. They are ideal bearings for important installations calling for induced or forced draft. Designed in cooperation with engineers of leading fan and blower manufacturers, they have a long record of dependable performance in critical service.

Dodge Sleevoil Pillow Blocks are normally available from stock—in both plain and water-cooled types, in shaft sizes from 1-7/16" to 8". Write us for information.

DODGE MANUFACTURING CORPORATION
400 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on *modern* power transmission machinery for *modern* installations. Look for his name under "Power Transmission Equipment" in your local classified phone book.

FIRST IN POWER TRANSMISSION MACHINERY!

SEALED-LIFE V-BELTS; TAPER-LOCK SHEAVES

TORQUE-ARM SPEED REDUCERS

DODGE-TIMKEN PILLOW BLOCKS

ROLLING GRIP AND DIAMOND B CLUTCHES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO 22, ILLINOIS.

MAGNESIUM CHIPS

SAND FROM WHEEL PITS

SPENCER VACUUM IN THE *Metal* INDUSTRIES for

BENCH CLEANING
METAL RECLAIMING
MILLING CHIPS
SOAKING PITS
SUMP CLEANING
TANK CLEANING
TIN PLATE CLEANING
WELDING FUMES AND FLUX AND
ALL AROUND SANITATION

A recovery of tons of babbitt, or pounds of solder flux and gold, or the cleaning of hot pits without waiting for them to cool are essential applications of Spencer Vacuum introduced in the speed-up during the last war. Delicate instruments were bench assembled, inspected and cleaned in half the time, and thousands of products made ready for painting or enameling in minutes instead of hours.

Withall, the same machine improved the sanitary conditions of busy plants and removed bulky materials from floors and dangerous dusts from pipes, ceilings and walls.

There are more than 100 essential industrial economies illustrated in Spencer Bulletin No. 144—yours for the asking.

SPENCER 1½ H.P. INDUSTRIAL PORTABLE

427-B

THE SPENCER TURBINE COMPANY • HARTFORD 6, CONNECTICUT

SPENCER HARTFORD

YOU MUSTN'T MISS—

Begins on page 234

QUOTES

Big Investment Needed

"By 1960, it is estimated that the United States will have 20-million more consumers, of whom only 5-million will be in the normally employable age groups. Those at work are likely to face the task of supporting not only a larger number, but also a much larger proportion of the population than in any previous period of our history.

"If, at the same time, we must still man a vast defense production machine, and maintain armed forces capable of protecting our national security, productivity per worker over the next decade must increase by 30% or more, unless our standard of living is to be degraded.

"Such an increase in individual productivity can be attained only by providing every American workman with more effective tools and greatly improved methods of production.

"The amount of private capital needed is great. American industry will have to invest, during the 1950's, $200-billion, or possibly more in 10 years—almost as many dollars, though of lower buying power, as were invested in the last 30 years.

"With little apparent limit on the expanding scope and content of government functions, we may ask whether such great capital needs can be supplied from private means."—*John L. Collyer*, president, The B. F. Goodrich Company.

Cash in your Scrap!

Turn the page

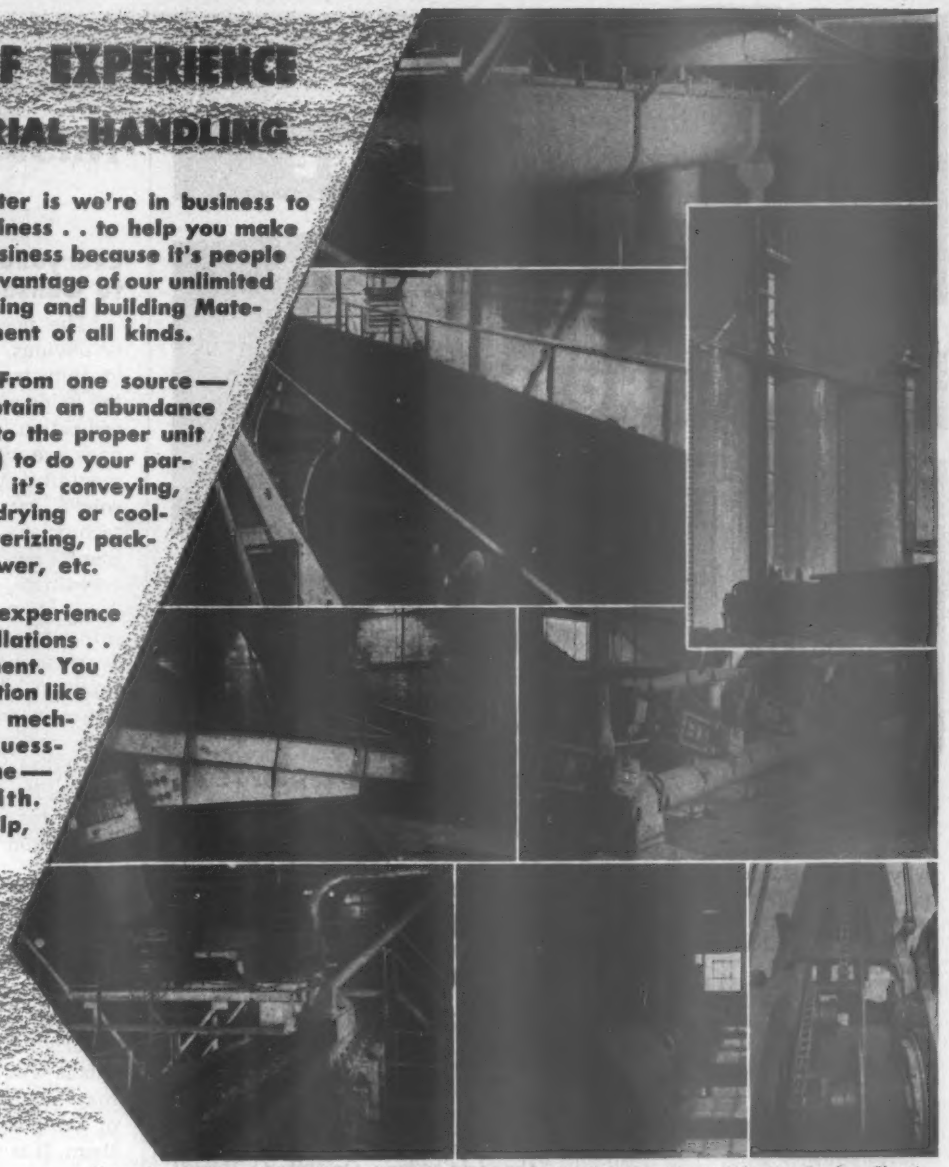
A LOT OF EXPERIENCE IN MATERIAL HANDLING

The fact of the matter is we're in business to help you stay in business . . to help you make a profit. We're in business because it's people like you who take advantage of our unlimited experience in designing and building Material Handling Equipment of all kinds.

Why shop around? From one source—Jeffrey—you can obtain an abundance of sound advice as to the proper unit (or complete system) to do your particular job, whether it's conveying, elevating, feeding, drying or cooling, crushing or pulverizing, packing, transmitting power, etc.

Lots of engineering experience . . hundreds of installations . . dependable equipment. You can't beat a combination like that when you want mechanization without guesswork or loss of time—without losing faith. We'll be glad to help, constructively.

FROM ONE SOURCE

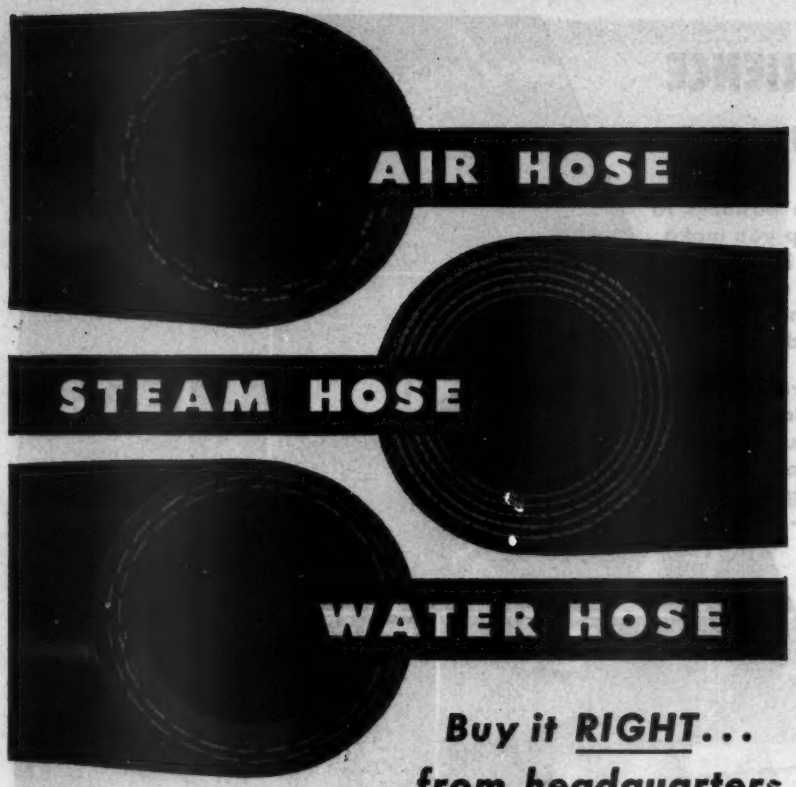


Photos (top to bottom): Spiral Conveyor, Belt Conveyor, Bucket Elevators, Electric Vibrating Feeders, Electric Vibrating Tubular Conveyor, Constant Weigh Feeder and Pan Conveyor, Pulverizers and Chain Drives.

ALSO: Bin Valves, Packers, Chains, Apron Feeders, Belt Trippers, Magnetic Separators, Screens, Shredders, Skip Hoists, Belt Idlers, Car Pullers, Dryers, Coolers, Crushers

THE JEFFREY MANUFACTURING COMPANY
911 North Fourth St., Columbus 16, Ohio
ESTABLISHED 1877

Complete Line of Material Handling, Processing and Mining Equipment



Buy it RIGHT... from headquarters

Each type of hose must be engineered *for* the job to stay *on* the job! That's why Hewitt-Robins industrial hose gives the long, efficient, low-cost service you want. That's why you get essential qualities like these when you buy . . .

Hewitt-Robins AIR HOSE: Inner tube withstands oil vapor from compressor and hose-conveyed tool oil. Tough walls resist high pressures, heavy blows. Rugged cover withstands oil, weather, abrasive rocks, tracks, concrete. Flexible, non-kinking construction makes handling easy.

Hewitt-Robins WATER HOSE: Tube is compounded to assure full flow, resist weak acids, alkalies. Strong walls withstand high water pressures, shock impacts. Flexible—easy to handle at machines, tanks, vats. Sturdy cover resists severe blows, rough surfaces, weather-checking.

Hewitt-Robins STEAM HOSE: Special tough rubber tube resists swelling, hardening, and cracking action of live steam. Rugged rubber-insulated walls withstand high steam pressures and temperatures. Highly flexible, yet resists expansion and stretch. Tough, pliable cover withstands heat, abrasion, cutting, weather.

Hewitt-Robins uses natural and synthetic rubber, cotton, rayon, glass, and chemicals *as needed* to insure efficient hose service. Each type is torture-tested to prove it *right* for the job.

Look up your Hewitt Rubber Distributor under "Rubber Products" in your phone book. Whatever your hose problem, you can be sure he has the *right* answer. Or write to Hewitt Rubber Division, 240 Kensington Ave., Buffalo 5, N. Y.

Hewitt-Robins is participating in the management and financing of Kentucky Synthetic Rubber Corporation.

HEWITT-ROBINS
Air • Steam • Water Hose

HEWITT-ROBINS INCORPORATED

BELT CONVEYORS (*belting and machinery*) • BELT AND BUCKET ELEVATORS
CAR SHAKEOUTS • DEWATERIZERS • FEEDERS • FOAM RUBBER PRODUCTS
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TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS

YOU MUSTN'T MISS—

Begins on page 234

Everyone Needs to Conserve

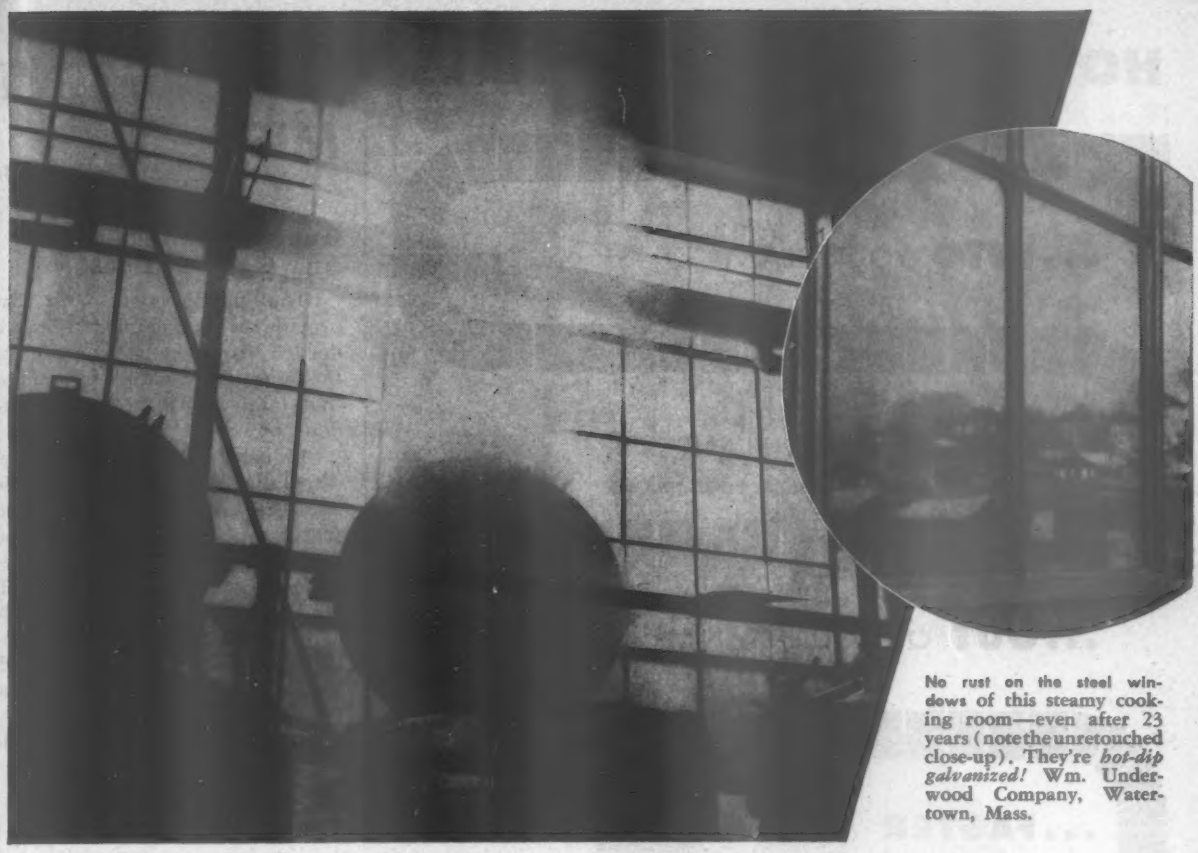
"The urgency of conservation is obvious. The greatest efforts of industry and government in the fields of simplification, standardization, substitution, and salvage are vital to success. Fundamentally, the problem will be solved by the executives and technicians of industry. Government can assist, advise, and coordinate, thereby minimizing duplication of effort, exchange of information, and stimulating concentrating forces on a particular problem. It can put its own house in order by examining its own specifications, particularly for military procurement."—*Nathaniel Knowles,* deputy administrator for staff services, Defense Production Administration.

Qualities of a Good Leader

"A good leader should be able to generate as much enthusiasm for another man's ideas as though he originated them himself. And this is true even though the ideas may not be in accord with those of the person who must execute them. It is only through this type of proper respect for authority that we can convey to those under our supervision, and execute properly, the things we set out to accomplish.

"How nice it would be if we could eliminate from the shop such statements as these made by supervisors: 'I don't know, I only work here,' or 'It's some crazy idea from the front office.' We fail in our obligation as managers when we take an attitude that is negative. We must have a positive approach to carry out those things that we are directed to do."—*W. G. Caples,* president, Inland Steel Container Co.

Turn the page



No rust on the steel windows of this steamy cooking room—even after 23 years (note the unretouched close-up). They're *hot-dip galvanized!* Wm. Underwood Company, Watertown, Mass.

Even 23 years of steam didn't rust these steel windows

Those cooking caldrons spew out steam and soak the air with water. And back in one corner pans are washed with a steam hose.

Yet these steel windows in the Wm. Underwood Company, canned food producers, have not rusted in *23 years.*

Why? They were *hot-dip galvanized!*

Now here's the *really* big news! Fenestra* Engineers have developed a new hot-dip galvanizing system that does an *even better* job—and they've built a special new plant around it, the only plant of its kind in America. It has special tanks, special automatic controls—everything especially designed to give you the most *permanent, maintenance-free* windows made.

Galvanizing is done *after* assembly of window frames and assembly of ventilators (and after cleaning, rinsing, fluxing and drying)—so that every bit of exposed metal gets a locked-on protective coating. To make sure the zinc coating is uniform, windows are hung from a unique conveyor that completely immerses them in molten zinc in one deep dip. Then withdraws them at controlled speed.

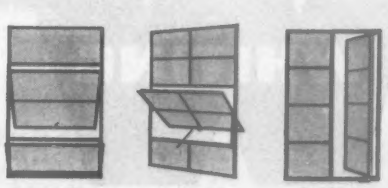
Then the windows dip into the Bonderizing tank. Bonderizing gives them an attractive appearance and prepares the surface for immediate decorative painting if you *want* to paint them.

Check on these windows today. *Steel-strong windows made to STAY new* put real meaning in the term "maintenance free!" Call your Fenestra Representative (he's listed in the yellow pages of your phone book) or write to Detroit Steel Products Company, Dept. FM-12, 2266 E. Grand Blvd., Detroit 11, Michigan. *®

Steel-Strong Windows made to STAY new

Fenestra

HOT-DIP GALVANIZED STEEL WINDOWS



Intermediate Industrial Residence

HOW TO MOVE MATERIALS

...INTO YOUR PLANT

...ABOUT YOUR PLANT

...OUT OF YOUR PLANT

...FASTER AND AT LOWER COST!

WHITING CORPORATION
15689 Lathrop Ave., Harvey, Illinois

yes! Send me "Quick Facts On Handling," the new brochure that gives important suggestions on how to analyze materials handling problems in *4 concise steps!*

Firm Name

Attention

Address

City Zone State

WHITING

Trackmobile—spots, switches and hauls railway cars faster at lower cost!
Trambeam Overhead Handling Systems—increase plant capacity!
Overhead Cranes—move the heaviest loads safely and quickly!
Electric Chain Hoists—fast, economical lifting!

YOU MUSTN'T MISS—

Begins on page 234

Good Incentives Are Good Business

"That nation is strongest that provides whatever incentives are needed to make its people do their best. That nation is weakest that fails to utilize the tremendous power of self-interest.

"Industry . . . must compete, after all, for a share of the able and the talented—it is the old familiar problem of supply and demand. If financial rewards decline in attractiveness, we will see many of our ablest people selecting those fields where incentives are of a different kind. The loss to industry will be serious."—*Crawford H. Greenewalt,* president, E. I. duPont de Nemours & Company.

Industry's Moral Base

"Great as has been our progress in laboratories and research centers, I am convinced that our free economic and political system has done an even more outstanding job in advancing human welfare. . . .

"A moral base has been built into our industrial fabric and the result has been a people's revolution that surpasses in speed and social impact anything the world has ever known."—*John Hay Whitney,* financier and philanthropist.

Gain Success by Giving it

"Business success is like happiness—you can gain it only by giving it. I do not know how any honest business can prosper without adding to the prosperity and welfare of our whole society; nor do I know of any lawful enterprise that has ever achieved success without contributing to the success of others."—*Benjamin F. Fairless,* president, United States Steel Corporation.

RAY NELSON, Manager, Blower Division, U. S. Air Conditioning Corp., says:

Durkee-Atwood V-Belts solved our Vibration problem

"In designing our Type CH Ventilating Sets, we found heavy vibration in test models . . . and traced the trouble to the short-center V-drive. When we called in Durkee-Atwood engineers, they showed us that the vibration was caused by the multiple belts. Durkee-Atwood solved this problem by vibration-testing their standard belts on their special equipment to meet our requirements. These belts, perfectly matched and with uniform cross sections, completely eliminated vibration. They run so true that *we have not had a single complaint from the field* on the performance of this ventilating set."

ATTENTION PLANT MAINTENANCE ENGINEERS

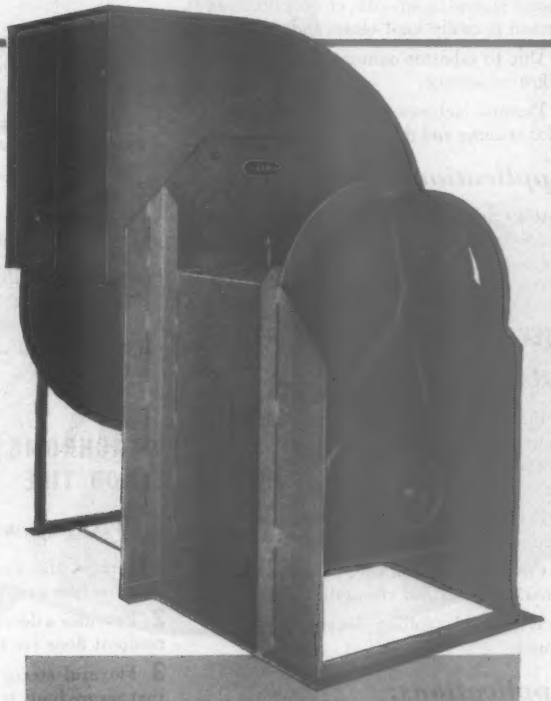
Vibration from mis-matched V-belts isn't confined to ventilating sets alone! It can make trouble in *all* your V-drive plant equipment . . . cause lower production, more maintenance time, increased belt replacement costs. So give Durkee-Atwood a chance to help!

Durkee-Atwood is a medium-sized company, so we can give exacting attention to every belt order. With our special testing equipment, we assure absolute matching of multiple belts . . . make sure that cross sections are perfectly uniform. This means *vibration-free* transmission for you . . . increased production and longer lasting service for your plant machinery.

Our moderate size permits fluid production, too—special work and emergency orders. Yet D-A's six modern plants and up-to-date equipment can handle your biggest orders.

If your plant has a defense contract, then you'll like Durkee-Atwood service . . . whether a simple belt replacement or help in designing a new drive set-up. Every D-A distributor is hand-picked to deliver the right-sized belts—*when you want them*—from the complete stocks of a full line. Or if you have a special design or production problem, experienced D-A engineers will help you work it out.

In our 30 years in business, we have established a record for quality V-belts. That is why we can guarantee the life of every Durkee-Atwood V-Belt! Write for complete details—or ask your nearest Durkee-Atwood distributor.



usAIRco Type CH Housed Ventilating Sets. For efficient, low-cost ventilation application . . . for factories, laboratories, hotels, restaurants, hospitals. Compact, weather-proof design for inside or outdoor application. Capacities from 500 cfm to 18,000 cfm.

V-DRIVE ENGINEERING DATA— WRITE FOR FREE COPY

DURKEE ATWOOD V-BELTS

DA PRODUCTS

Form No. 522

DURKEE-ATWOOD COMPANY

Dept. F-12 • Minneapolis 13, Minnesota

Lower Your Flooring Costs

Right from the Start

...with one of these Beautiful TILE-TEX floors

TILE-TEX* ASPHALT TILE

Advantages:

1 Durable asphalt-asbestos composition that provides rugged, resilient flooring at low cost.

2 Readily adjusts to average sub-floor contours at or below grade.

3 Unwaxed Tile-Tex is non-slip even when wet, and its smooth, closely textured surface is easily kept clean and sanitary.

4 Due to asbestos content, it ranks high in fire resistance.

5 Permits achievement of almost any color scheme and design objective.

Applications:

Hotels • Schools • Hospitals • Restaurants
Clubs • Offices • Homes
and wherever a low-cost, highly durable flooring is required.

TUFF-TEX* GREASEPROOF TILE

Advantages:

1 Plastic-asbestos tile which completely answers the requirements of heavy-duty flooring for industry and wherever grease-abuse is heavy.

2 Provides extraordinary resistance to grease and oil.

3 Combines high impact resistance with remarkable flexural strength.

4 Withstands rolling friction the year 'round.

Applications:

Machine Shops • Locker Rooms
Assembly Areas • Recreation Areas
Shipping Space • Warehousing Space
Kitchens • Cafeterias
and wherever a truly heavy-duty or grease-resistant flooring is needed.

FLEXACHROME* PLASTIC-ASBESTOS TILE

Advantages:

1 A unique, resilient composition, not only greaseproof in standard thicknesses, but also highly resistant to both acids and alkalis.

2 High impact resistance plus flexural strength.

3 Can be safely installed on either wood or concrete sub-floors, at or below grade.

4 32 brilliant colors and 9 sizes allow wide scope of design and almost unlimited decorative advantages.

5 Remarkable ease and economy of maintenance.

Applications:

Combining the advantages of all types of resilient flooring, it is widely used over wood sub-floors, and proves ideal for many areas subject to special abuse, as well as where color appeal is a paramount requirement.

VITACHROME† RESILIENT FLOOR TILE

Advantages:

1 One of the most economical plastic-asbestos tiles ever developed.

2 Provides a decorative, grease-resistant, resilient floor for food-serving areas.

3 Flexural strength and wear-resistance that assure long, trouble-free performance at low cost.

Applications:

Restaurants • Clubs • Hotels
or wherever inexpensive, durable and decorative floors are required.

MURA-TEX* PLASTIC-ASBESTOS WALL TILE

Advantages:

1 Companion product to Flexachrome... blends or contrasts perfectly with that flooring.

2 May be installed directly on either new or old plaster or proper dry-wall construction.

3 Eliminates costly resurfacing of wall areas.

4 Particularly well suited for baths and kitchens in existing homes.

Applications:

Virtually all areas where sanitary, permanent wall surfaces are desired. This includes wainscoting in
Office Buildings • Schools • Hospitals
as well as use in homes and industrial structures.

GET THE WHOLE STORY

Your local Tile-Tex Contractor will give you the whole story about the economy of Tile-Tex Products . . . their uniform cut . . . their wide range of colors and sizes . . . their smooth, closely textured, easy-to-clean surfaces. He will show you how tile-at-a-time installation makes possible unlimited designs and lowers maintenance, repair or alteration costs. Look for his name in the classified pages of your telephone directory. Or, write us . . . we'll send you his name . . . and literature on Tile-Tex products.

THE TILE-TEX DIVISION, The Flintkote Company, 1234 McKinley St., Chicago Heights, Ill.

Asphalt TILE-TEX Tile Plastic TILE-TEX Tile

*REGISTERED TRADEMARK, THE FLINTKOTE COMPANY †TRADEMARK

TILE-TEX... *Complete Flooring Service*

quicker maintenance

not less maintenance

is the ANSWER to RISING COSTS!

You get *quicker maintenance* with Benjamin "Turnlox" Reflector equipment because they *cut the time* required for cleaning and re-lamping. This detachable reflector assembly is so easy to handle that it actually encourages more consistent lamp replacement and reflector cleaning. Such a program may prevent the loss of as much as 40% of the light you pay for.

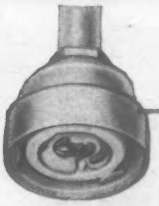
FREE "TURNLOX" DATA BULLETIN AD5600 brings you specifications of the eight different Benjamin "Turnlox" Incandescent Lighting Units. Benjamin Electric Mfg. Co., Dept. N, Des Plaines, Ill.

Specify **BENJAMIN**

"Turnlox"

DETACHABLE REFLECTOR EQUIPMENT

Sold Exclusively Through Electrical Distributors



A slight upward pressure, and less than a quarter turn to the left, and both reflector and lamp are released from wiring terminal base in hood! It is just as simple to put back up—turn right and reflector is secured! *Self-cleaning* contacts!

R5679SR

"Turnlox" makes possible *quicker, safer* reflector maintenance

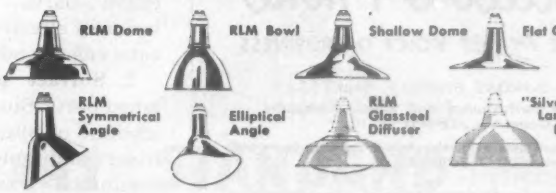
With a few extra reflector units, it is possible to change an entire bay at a time. Simply take down dirty reflectors and replace with units which have been previously cleaned . . .

. . . on the ground

. . . or at the bench

5/0 BENJAMIN

There's a Benjamin "Turnlox" Unit for every Incandescent Lighting Requirement!



Speed Up Reflector Cleaning and Maintenance

Is this your bottleneck?

Today's faster business pace makes one fact clear. In many plants and offices the regular exterior telephone system is not enough! It may actually be a bottleneck! Kellogg SELECT-O-PHONE breaks that bottleneck!

- **INCREASE PRODUCTION**
- **IMPROVE EFFICIENCY**
- **REDUCE COSTS**

Automatic, requiring no operator and independent of your switchboard, SELECT-O-PHONE is the modern means of transmitting orders, of exchanging ideas with individual executives or groups *inside* your business!

GET THE FACTS

Many of the greatest names in commerce and industry are already using SELECT-O-PHONE! For complete information, send coupon today to:

KELLOGG
Select-O-Phone
THE INSIDE VOICE OF BUSINESS

SELECT-O-PHONE DIVISION, Dept. 12-L
Kellogg Switchboard and Supply Company
6650 S. Cicero Ave., Chicago 38, Ill.

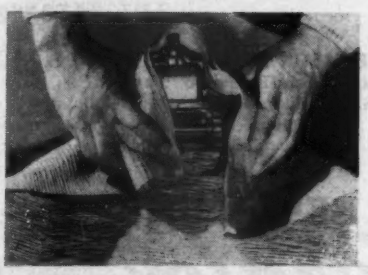
Please rush data explaining how I can save hours and dollars with SELECT-O-PHONE.

NAME_____
COMPANY_____
CITY_____ ZONE____ STATE_____

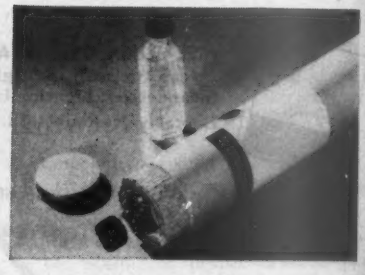
NEW MATERIALS

1 For flotation wrapping

2 For surface protection



3 For blocking and bracing



4 For shipping samples.

LAMINATED PAPER WRAP HELPS YOU ...

... Solve 4 Packing Problems

Sof-Rap is a laminated packaging material that combines a tough kraft paper with a resilient inner wrap. The outer layer of kraft withstands scuffing and abrasion. The resilient inner layer absorbs shock and vibration. The two krinkled layers are bonded together to permit a certain amount of slippage between kraft and inner wrap. The result, according to Nichols Paper Products Co., Green Bay, Wis., is a flexible wrap that affords maximum protection to packaged parts.

Here are four ways in which they claim you can make Sof-Rap work for you:

1. Flotation wrapping of precision parts. The soft, inner wrapper effectively cushions delicate edges and corners.

2. Surface protection of finished parts. Since there's a certain amount of slippage between the inner and outer layers of this laminated wrap, much of the friction resulting from rough handling is not transmitted to finished surfaces.

3. Blocking and bracing of irregular shapes. The krinkled texture of Sof-Rap is said to conform to complicated parts without puncturing or tearing. In this way you can block irregular parts into any wrapped shape that is convenient to handle and stack.

4. Shipping samples, especially liquids and heat-sensitive specimens. The Nichols people claim that Sof-Rap provides rapid liquid absorption. And it's a good insulating barrier against heat and cold.

•

VINYL CEMENT, a solvent-type bonding agent, will bond either flexible or rigid vinyl sheets and molded sections. You need only one surface application, according to Schwartz Chemical Co., Inc., 326 W. 70th St., New York.

Turn the page

Now more important than ever to you...

Standard's LOCAL Lubrication service

• Wherever you are located in the Midwest, there's a Standard service-supply center close at hand. That means prompt delivery of Standard products, immediate assistance from a Standard lubrication specialist.

There's no need to worry over possible production delays due to lack of the right cutting oil, lubricant, or fuel . . . no need to stock-pile these supplies in your own plant . . . no need to wait for help in solving your lubrication problems.

To take advantage of Standard's time-saving *local* lubrication service (now more important than ever to you) call the Standard office in your area. Or write: Standard Oil Company (Ind.), 910 South Michigan Avenue, Chicago 80, Ill.

STANDARD OIL COMPANY STANDARD (INDIANA)

Do It Electrically

Electric power, produced wholesale in a central station, is the lowest-cost power you can buy. EDISON Nickel-Iron-Alkaline Storage Batteries make it available to material-handling trucks with these important additional advantages: high-torque electric-motor drives . . . power instantly on and off for maximum efficiency in the inherently stop-and-go operation of material-handling trucks . . . quiet operation . . . no inflammable fuel . . . no odors or exhaust fumes . . . maximum availability.

EDISON Nickel-Iron-Alkaline Storage Batteries employ steel cell construction, an electrolyte which is a recognized preservative of steel and a foolproof electrochemical principle of operation. They are unequaled for durability, dependability, long life and operating economy. In combination with electric-motor drives, they insure the closest approach to failure-free truck operation known. They are available in steel cradles and demountable steel boxes for ease in exchanging at convenient intervals for multiple-shift truck operation.

Because EDISON batteries are so widely known for high quality, many people think they are higher priced than they really are. Get prices on the capacities required by your trucks. By comparing this factor with their well-known long life, you will see why they are first choice of cost-conscious users. Send for free copy of our bulletin *Modern Material Handling;* describes the unit-load method of handling, the power requirements of material-handling trucks, and the characteristics of EDISON batteries; 28 pages; 8½x11; profusely illustrated. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Thomas A. Edison of Canada, Limited, Montreal.

NEW MATERIALS

Begins on page 262

Fluorine May Be Key to More Stable Products

It may not be long before you are getting better plastics, solvents, and lubricants through the use of fluorochemicals, claims Minnesota Mining & Manufacturing Co., 900 Fauquier Ave., Saint Paul 6, Minn.

The fluorochemicals are a family of carbon compounds with a high percentage of fluorine. Their basic use will be as chemical intermediates in the manufacture of other products.

The great promise for fluorochemicals lies in their inert nature. Substances made with them will take heat well over 1000F without breaking down. The fluorochemicals also show high resistance to weather, fire, and fungus, and have great chemical stability.

Here are some of the uses for fluorochemicals now under study:

Stable lubricants • Resistance of these fluorine compounds to heat, corrosion, and acid formation may make possible permanent lubricants and hydraulic fluids to replace oil.

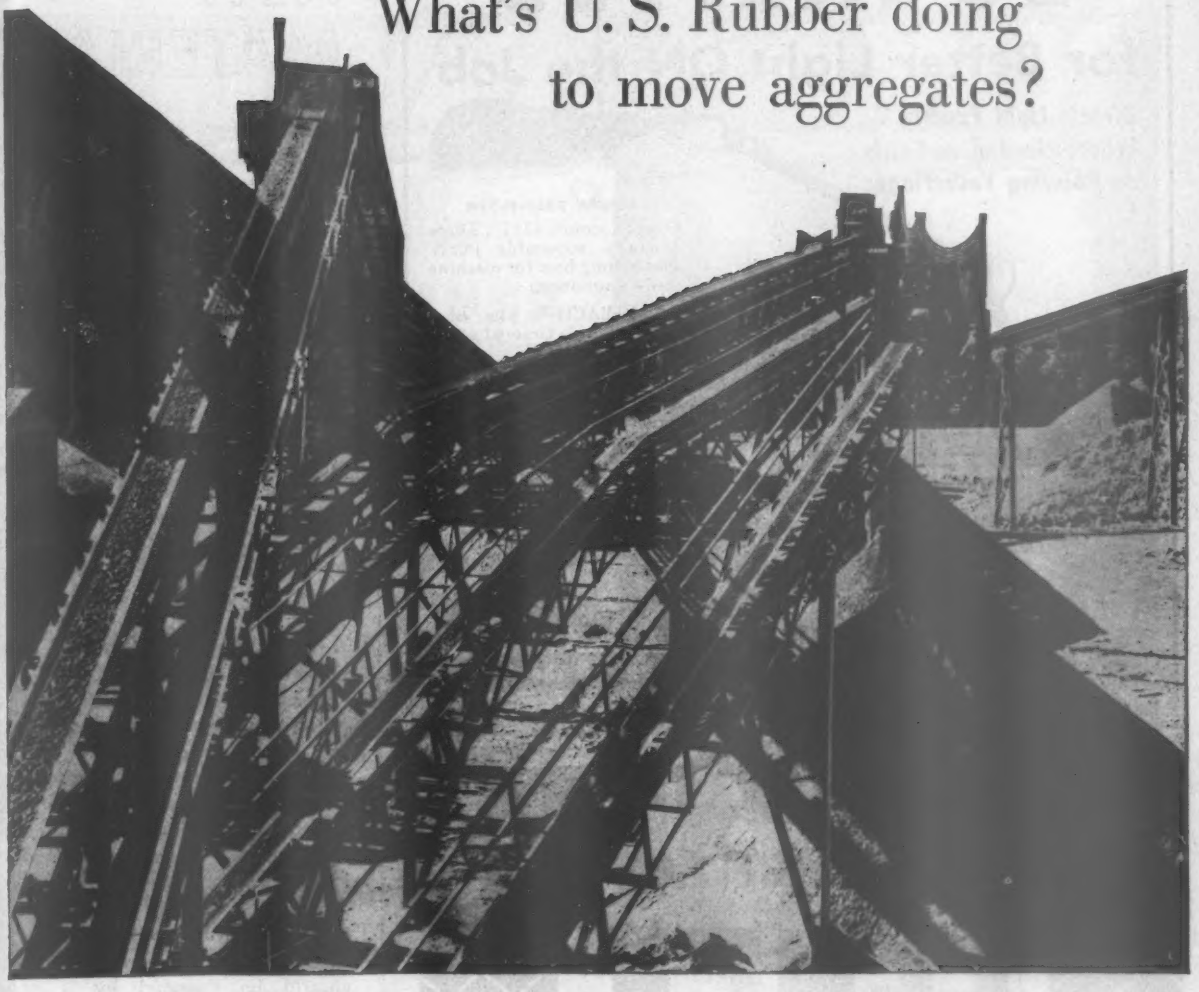
Wetter water • A 1% solution of the new chemical lowers the surface tension of water and other liquids more than the best detergent.

Non-flammable film • Use of fluorochemicals in cellophane, X-ray and photographic film may end the serious fire hazard of these materials.

New Carbides Substitute Chromium for Tungsten

Just when the supply of tungsten carbide is getting tighter and tighter, along comes a new family of chrome carbides made by Carboloy Co., Inc., E. Eight Mile Drive, Detroit 32. These metallic carbides use plenty of chromium —an allocated material. But they

What's U. S. Rubber doing to move aggregates?



Nearly 3 miles of United States Rubber belting, varying in width from 24" to 42", is used in all the phases of aggregate processing at the Hungry Horse Dam. Above is shown a series of the belts carrying sized materials to the storage piles.

U. S. Rubber engineers worked with the constructors of the dam and the designers of conveyor equipment to produce this highly efficient conveyor system. ALL the belting used to "feed" Hungry Horse Dam was furnished by U. S. Rubber.

NEARLY six million tons of aggregates are being carried to the site of the mammoth Hungry Horse Dam in Montana—all on U. S. Rubber belting. The dam is under the supervision of the U. S. Bureau of Reclamation.

Whenever you have a problem involving materials handling, no matter how big or small, get in touch with our engineers. Write to address below.

PRODUCT OF U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

LOCALITES

for Better Light ON the Job

Directs Light Exactly Where Needed as Easily as Pointing Your Finger

MODEL 3267-H-174

Overall length 32¾". Three instantly adjustable joints. Flat oblong base for machine screw mounting.

Designed Especially for Machine Tools, and Work on Assembly and Inspection Benches

$6.12 EACH in pkg. of 6
Single Units $7.65 ea.

- **Rugged Construction** to stand strains and shocks
- **Instantly Adjustable** with full swivel ball and socket joints
- **Infra-red Baked Enamel Finish**—Exterior, Wrinkled Gray — Reflector Interior, high temperature White
- **Reflector** accommodates 100 watt A-21 medium screw base lamp
- **Wired Complete** with switch socket and 8 ft. oil resistant cord

WRITE FOR COMPLETE CATALOG of Localite models with various type reflectors, arms and bases for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO

Localites are available through selected distributors everywhere.

LOCALITE fostoria for Light ON the Job

Reg. U. S. Pat. Off.

*CONTINENTAL FENCE

MADE OF *KONIK STEEL

Peace-of-Mind PROPERTY PROTECTION

Continental fence, the only fence made of KONIK steel, provides peace-of-mind property protection. KONIK, an open hearth alloy steel, contains copper, nickel, and chromium ...provides long-life—extra resistance to rust and corrosion. The dignified beauty of Continental chain-link fence enhances the property it protects. Write to Continental at Kokomo for complete information.

*Due to present National Defense requirements for nickel and chromium, two critical war materials, Continental fence will not be available in "Konik" steel for the duration of this emergency.

*Trade Mrks Reg. U.S. Pat. Off.

CONTINENTAL STEEL CORPORATION
Kokomo, Indiana

Please send FREE copy of "Planned Protection"—complete manual on property protection.

Name_____

Address_____

City_____ State_____

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

PRODUCERS OF Manufacturer's Wire in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Piano-Tested, Copperized, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated-Steel Sheets, Nails, Continental Chain Link Fence, and other products.

NEW MATERIALS

Begins on page 262

need no tungsten or cobalt—materials in much shorter supply.

Carboloy points out that the new carbides have physical properties in many respects better than conventional tungsten carbides. Here's how they size up their chrome carbides:

- Corrosion resistance greater than tungsten carbide, 30 times that of stainless steel.
- High resistance to erosion and abrasion.
- Ability to stand high temperatures without oxidation. At a test temperature of 1850F the new carbide still retained its luster. But stainless steel and tungsten carbide samples had completely disintegrated.
- Coefficient of thermal expansion almost the same as steel.
- Lighter weight.
- Completely non-magnetic.

The new chrome carbides will find immediate use in such applications as gage blocks, valve seats, and centrifuge blades.

PAINTING AND PRIMING of industrial and consumer goods should be speeded by a new alkyd resin of General Electric Co., Pittsfield, Mass. Glyptal 7422 air dries dust-free in 5-10 minutes, tack-free in 3-4 hours.

RUBBER LUBRICANT made by International Products Corp., P.O. Box 118-A, Trenton 1, N. J., makes it easier to machine and cut rubber and elastomers. Lubricant P-80 also simplifies assembly of rubber components such as grommets and channels.

INSTEAD OF A JIG you can use Form-A-Jig. This plastic cement will hold parts securely for welding, brazing, and soldering. Eutectic Welding Alloys Corp., 172nd St. & Northern Blvd., Flushing, N. Y.

L-S "JACKSTACKER" TIERING TRUCK

The ONE and ONLY

1000 LB. CAPACITY TIERING TRUCK

with these

OUTSTANDING Fork Truck FEATURES

TELESCOPIC AND TILTING

130" HIGH LIFT. 83" Collapsed height

44" TURNING RADIUS. Extra narrow aisles

SHORTEST COUNTER BALANCED TRUCK
Less than 4 ft. long

PRECISION DESIGN and MANUFACTURE
High quality components, designed and manufactured in our own shops, embody high pressure hydraulic system which permits extra short 46½" length.

NO GREASE POINTS
Minimum maintenance and
Minimum down time.
Maximum saving in manpower.

The ONLY Truck with
"ALL CONTROLS IN HANDLE HEAD"

2 speeds forward. 2 reverse. Electric Brake. Tilt out and in. Lifting, Lowering, Horn, Lock . . . Operates with handle VERTICAL (saves extra space) and in any other position.

Designed to operate in trailers. 106" fork lift hgt. 71" collapsed hgt. Saves time, money.

Forks fold back, leaving actual clearance required only 47". Scores of uses. Economical.

For Distribution, Warehousing Receiving and Shipping

WIDELY USED with chisel forks, for handling cases, crates, bales, refrigerators, desks, stoves and other products WITHOUT PALLETS

Write for Bulletin 24

LEWIS-SHEPARD

MULTIPLY MANPOWER LEWIS-SHEPARD

LEWIS-SHEPARD PRODUCTS INC., 274 WALNUT ST., WATERTOWN 72, MASS.
Factory Plant CRAWFORDSVILLE, IND. - SALES-SERVICE IN PRINCIPAL CITIES - CONSULT YOUR TELEPHONE BOOK

CONTROL in the manufacture of gears is, we think, a matter of complete control . . . control of every operation.

• At BRAD FOOTE we have complete control of each step from the inception of the original design to the delivery of the finished gears you use. For here . . . in our own plant . . . we design, engineer, machine, heat-treat, test, inspect, clean, and finish every gear. No one shares our responsibility.

• Our control guarantees the quality of BRAD FOOTE gears . . . gives you assurance that the gears you buy will perform satisfactorily when used in your shop . . . or on the equipment you sell to others.

BRAD FOOTE GEAR WORKS, Inc.

1309 South Cicero Avenue • Cicero 50, Illinois
Bishop 2-1070 • OLympic 2-7700

subsidiaries

AMERICAN GEAR & MFG. CO. • Phone: Lemont 920 • Lemont, Illinois

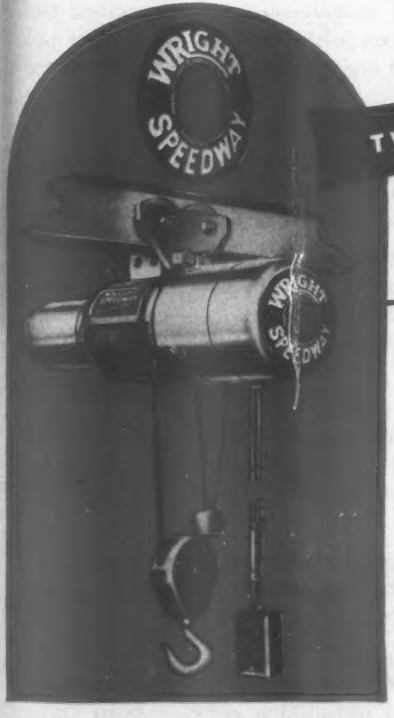
PITTSBURGH GEAR COMPANY • Phone: Atlantic 9950 • Pittsburgh 22, Pennsylvania

☑ Check your Hoist needs...

HAND-OPERATED (CHAIN)

STYLE	TON CAPACITY
CRANES WITH END TRUCKS	
☐ Top running, hand traveling	1 to 20
☐ Underhung, hand traveling	1 to 10
HOISTS	
☐ Wright Safeway, light, portable	½ to 4
☐ High speed, improved	¼ to 50
☐ Clevis-connected	¼ to 10
☐ Handwheel, extended	¼ to 3
☐ Twin hook	¼ to 10
☐ Differential	¼ to 1½
TROLLEY HOISTS	
☐ Wright Safeway	½ to 4
☐ Wright Army type Safeway	¼ to 10
☐ Hi-Way 600 type	¼ to 24
TROLLEYS ONLY	
☐ Timken	¼ to 40
☐ Hyatt	¼ to 5
☐ SARB	¼ to 12
☐ Wrightway	½ to 3
☐ Double beam	2 to 20

Buy **WRIGHT!**



TWO OF AMERICA'S FINEST

MOTOR-DRIVEN (WIRE ROPE)

STYLE	TON CAPACITY
CRANES	
☐ Top running	1 to 10
☐ Underhung	1 to 10
HOISTS	
☐ Frame B	⅛ to ½
☐ Frame 1, Speedway	¼ to 1
☐ Frame 1, close headroom	¼ to 1
☐ Frame 1, Speedway, long-lift	¼ to 1
☐ Frame 2, Speedway (all suspensions)	½ to 6
☐ Frame 3, Speedway (all suspensions)	1½ to 10

for Information on the complete line of WRIGHT ELECTRIC HOISTS write for Catalog E-50

ACCO

York, Pa., Chicago, Denver, Detroit, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

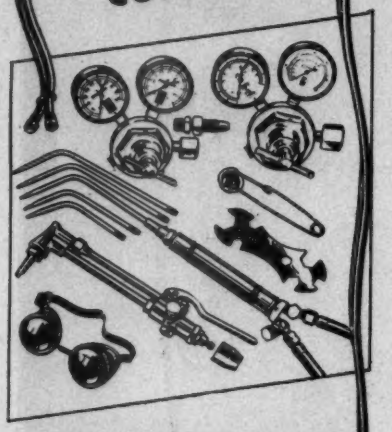
"Intentionally Better"
HOISTS
TROLLEYS
CRANES

WRIGHT HOIST DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Canada: UPTON, BRADEEN & JAMES LTD.
Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Vancouver

FOR
OXY-ACETYLENE
WELDING and
CUTTING



DOCKSON'S
№ 145 OUTFIT

fitted for a complete range of all-purpose welding and cutting operations as heavy as 5" steel.

No. 145 OUTFIT includes:

1—No. 4-E-C Hi-Speed Welding Torch.
1—Ea. Nos. 2, 4, 6, 8 and 10 "E" Style Elbow Tips.
1—C-4 Hi-Speed Cutting Attachment.
1—C-2 Cutting Tip.
1—No. 134-BE Oxygen Regulator, 200 lb. and 3000 lb. gauges.
1—No. 134-AD Acetylene Regulator, 60 lb. and 500 lb. gauges.
1—Commercial to P. O. L. Adapter.
1—12½ ft. length ¼" Siamese Hose.
4—Hose Connections.
1—Outfit Wrench.
1—Round File Gas Lighter.
1—Pr. Series 66-19-6 Welding Goggles.

THERE IS A DOCKSON DISTRIBUTOR NEAR YOU — Let us send you his name and our catalog of Welding and Cutting Equipment, a complete line "BUILT FOR BETTER SERVICE".

Dockson
CORPORATION
3839 WABASH • DETROIT 8, MICH.

Test Your Reading Ability

Answer the 10 questions below *after* you have read "How to Cut Reject Costs 80%" on page 74. Then turn to page 272 for the correct answers, and for details on how to score yourself and interpret your score.

QUESTIONS

Test questions and scoring key prepared by Paul D. Leedy, The Reading Institute, New York University.

1 · What is this article about, mainly?
——a) improving working conditions, ——b) better inspection methods, ——c) a quality improvement program, ——d) complaints about defective parts

2 · The Westinghouse division discussed in this article makes:
a) electric lights, ——b) elevator components, ——c) refrigerators, ——d) vacuum cleaners

3 · Initial publicity for the improvement program consisted of:
——a) advertisements in the city paper, ——b) speeches by foremen, ——c) posters prepared by the union leader, ——d) articles written by various people within the organization

4 · What was the nature of the campaign?
——a) contest of individual achievement, ——b) contest between men in the shop vs. men in the field, ——c) contest between team vs. team. ——d) contest between management vs. labor

5 · Prizes were given to teams that:
——a) made the best posters, ——b) wrote the best articles, ——c) showed the most improvement in cost of rejects, ——d) prepared the most interesting contest boards

6 · For whom was a training program provided?
——a) foremen and non-supervisory employees, ——b) shop supervisors and manufacturing engineers, ——c) inspectors and workmen, ——d) non-supervisory employees and district construction engineers

7 · The learning-by-doing method consisted of:
——a) giving workers specific lessons, ——b) making workers correct their mistakes, ——c) foremen driving home practical knowledge, ——d) foremen investigating, working out improvements, and reporting

8 · What method of inspection was instituted to help cut rejects?
——a) 100% inspection, ——b) field assembly inspection, ——c) first-piece and patrol inspection, ——d) electrical test inspection

9 · With what type of complaints did the complaint committee deal?
——a) complaints from field installation crews, ——b) complaints from workmen, ——c) complaints from general foremen, ——d) complaints from customers

10 · The reduction of field adjustment costs was due primarily to:
——a) publicity, ——b) training, ——c) better inspection techniques, ——d) the whole program

Turn the page

THE BULLDOG PLAN . . . A HIT WITH SWITCH USERS!

Samson
FOLDING TABLES AND CHAIRS

SHWAYDER BROS., INC.
4270 HIGH ST., ECORSE STATION DETROIT 29, MICHIGAN
FOLDING FURNITURE DIVISION

October 25, 1951

Bulldog Electric Products Company
7610 Joseph Campau Avenue
Detroit, Michigan

Gentlemen:

I have just been informed by our Purchasing and Maintenance Departments of the substantial savings in money and time we are already gaining through your safety switch simplification program. It is the kind of a report that is a pleasure to hear.

For example, prior to your program we were compelled to stock many different safety switch catalogue numbers to insure continuous production in the event of emergencies, or for normal replacement needs. Now we have reduced these inventories to a new low. This was possible only, I am told, because each switch in your simplified line replaces any one of several switches formerly required.

Such simplification is beneficial to us and other industrial plants for easing the problems of procurement and maintenance in these days of increasing shortages.

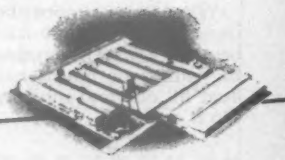
In addition, we appreciate the fact that these top-grade switches are available at medium-grade switch prices.

We strive to reduce every item of overhead expense and appreciate the cooperation of companies like yourself that help us to accomplish this through standardization and simplification.

Sincerely,

SHWAYDER BROTHERS, INC.
Benjamin H. Shwayder
Vice President

A TYPE A SWITCH
AT TYPE C PRICES



DENVER DETROIT
Also Manufacturers of Samsonite Luggage, Denver Coloredo

Safety switch users from all across the country are writing enthusiastic letters like this to BullDog . . . hailing the added convenience, slashed costs and substantial savings effected by the BullDog program of safety switch simplification.

There's every chance that *you*, too, will get similar benefits by ordering, stocking and using the new, simplified line of BullDog Vacu-Break Master Safety Switches.

Write Dept. 453-B for descriptive folder.

BULLDOG

BULLDOG ELECTRIC PRODUCTS COMPAN
DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO
THE LEADER IN FLEXIBLE ELECTRICAL DISTRIBUTIO

"Here's How We Keep This Asphalt Tile Floor Beautifully Clean at....

¼ the FORMER MAINTENANCE COST"

Picture shows floor nearly 10 months after the first and only application of Multi-Clean Asphalt Tile Preserver.

WITH THE MULTI-CLEAN METHOD

"We used to wax this floor on an average of twice a month; now we apply Multi-Clean Asphalt Tile Preserver only once a year and always have a clean, beautiful, non-slip floor," says the floor maintenance director at Griggs, Cooper & Co., St. Paul, large mid-western food processing firm.

THE MULTI-CLEAN METHOD on this company cafeteria floor is saving between 15 and 20 hours of maintenance time a month, and material costs have been cut from $200 a year to $30. The floor, which is 6 years old and in constant daily use, has been given a new look and longer life with Multi-Clean Asphalt Tile Preserver.

Ask the maintenance men and they'll tell you, it's easier now to keep the floor clean and control scuff marks. The daily routine of sweeping, wet mopping and polishing with a brush under a Multi-Clean floor machine has not been changed, they say, but, "the dirt comes up easier and the floor stays clean longer." Once a week the floor is burnished with a steel wool disc under the floor machine to eliminate scuff marks and restore the original color and beauty to the surface.

Want to hear more about this amazing floor treatment . . . how it will beautify your floors and save you money in your floor maintenance program? Just fill out and mail the coupon . . . Do it now!

The Multi-Clean Method is a planned and tested procedure including the use of proper materials and equipment with their correct application for all types of floors and floor conditions.

Multi-Clean Asphalt Tile Preserver

Multi-Clean Floor Machine

Multi-Clean Wet-Dry Vacuum

Every Multi-Clean Product carries a 100% Guarantee!

FREE! FLOOR MANUALS

Each for the proper care of a specific floor. Check the coupon for the manuals of your choice.

MULTI-CLEAN PRODUCTS, INC.

2277 Ford Parkway • Dept. FM-12 • St. Paul 1, Minn.

Gentlemen—I would like to know more about the Multi-Clean Method for my floors. Send manuals I have checked.

☐ ASPHALT TILE ☐ CONCRETE ☐ RUBBER TILE
☐ WOOD ☐ TERRAZZO ☐ LINOLEUM
☐ 5-JOB FLOOR MACHINE ☐ WET-DRY VACUUM ☐ ALL-PURPOSE SCRUBBER

Name_____

Address_____

City_____ Zone____ State_____

6-51

MULTI-CLEAN® PRODUCTS, INC.

READING TEST . . .

Begins on page 270

Answers to test questions

Q	A	CRED	Q	A	CRED
1	c	20%	6	c	10%
2	b	5	7	d	10
3	d	10	8	c	15
4	c	10	9	a	5
5	c	5	10	d	10

SCORING INSTRUCTIONS

Be sure to figure all three of your scores: comprehension, speed, and reading index. For a full explanation of these scores, as well as information on how to improve your scores, see "How to Read Better and Faster," on page 84 of FACTORY'S October 1951 issue. If you've passed your copy along to someone else, write The Editor for a reprint.

Comprehension score: Just add up the percentage credits for each of the questions you answered correctly.

Speed score: Refer to your note of how long it took you to read the article. Convert the time into seconds. Divide the result by 10. This answer you divide into 1063 (number of words in the article.) Finally, multiply this last result by 6. This will give you your reading speed in words per minute. (If you recorded your time in decimal minutes, you can get the result directly by dividing the time into 1063.)

Example: It took you 3½ minutes to read the article. That's 210 seconds. Divide 210 by 10, and you get 21. Divide 21 into 1063. Result is 50.6. Multiply this by 6. Your reading speed is 304 words per minute. (Or divide 3.5 into 1063 and get 304 words per minute.)

Reading index: To find your reading index, multiply your speed in words per minute by your percentage comprehension and divide by 100. Do not figure reading index if your comprehension score is less than 75%. With lower comprehension, the reading index is not valid.

Example: If your speed was 304 words per minute and your

Are 10,000 pumps enough for you?

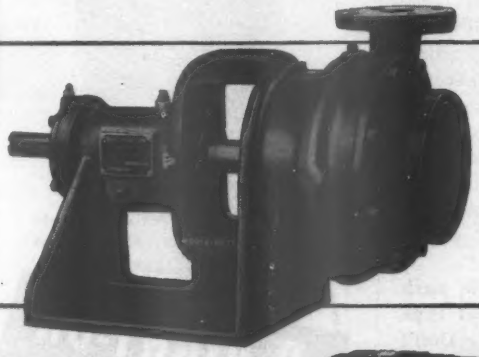
Just about. It takes that many different combinations to make sure that you—big user or small user—get exactly the right pump you need.

That's why we manufacture Worthington centrifugal pumps in over 10,000 standard combinations of capacities, heads, casings and mountings.

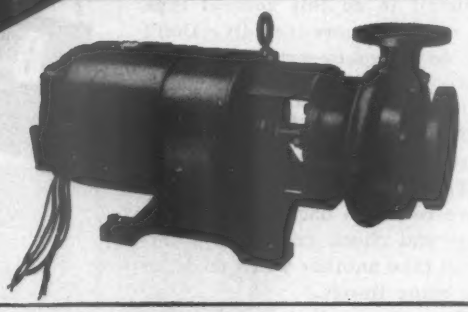
Types CN (frame-mounted) and DN (built-in motor) are made in capacities from 10 to 1800 gpm, heads to 535 ft., with 40 sizes of pump casings and 200 combinations of frame-mounted designs.

And—maximum interchangeability of parts!

Get the habit of asking for a Worthington—you'll get exactly the pump you want.



Type CN, frame-mounted, is a real "any-drive" pump—readily driven by electric motor, V-belt, or any other source of mechanical power.



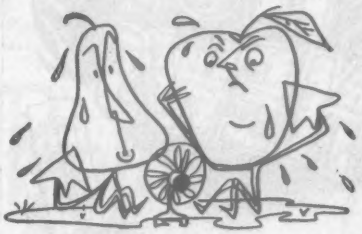
Type DN is the famous Worthington Monobloc design—compact, streamlined, with built-in motor. On both types, liquid ends are interchangeable, and can be equipped with either conventional packing or mechanical seal.

WORTHINGTON

THE GOOD RIGHT HAND OF INDUSTRY

POWER TRANSMISSION: sheaves, V-belts, variable speed drives. **PUMPS:** centrifugal, power, rotary, steam. **AIR COMPRESSORS:** water-cooled, air-cooled. PC.0.8

The Fruit Was in a Sweat



. . . and So Was the Pump

They suddenly began having a hot time of it at a fruit and produce company near the Dillon Supply Company in Raleigh, N. C.

A centrifugal pump used in their refrigeration system had called it a day, and the temperature was rising in the rooms where the produce was kept. Without refrigeration, the perishables would have indeed perished.

But a frantic call to Dillon located, in the distributor's stock of Worthington centrifugal pumps, exactly the size needed. Prompt delivery . . . and not a lettuce leaf was allowed to wilt.

It's another example of the wisdom of depending on your Worthington Distributor. No distributor offers *more* pumps . . . no distributor offers more *value* in pumps . . . than a Worthington distributor.

Worthington Pump and Machinery Corp.
Pump and Compressor Merchandising Div.
Harrison, N. J.

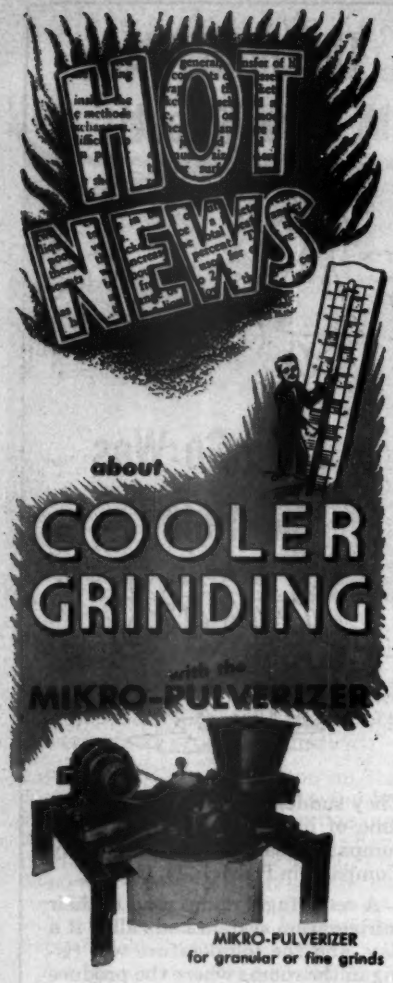
Send latest bulletin on Worthington Centrifugal Pumps. Any other (type).....

Name.....

Company.....

Address.....

City.....State.....



MIKRO-PULVERIZER
for granular or fine grinds

A simple change in our MIKRO-PULVERIZER has produced outstanding results, especially in the handling of heat-sensitive materials.

Altho this project is still in the development stage, we know that on some materials it means . . .

25% reduction in temperature rise
25% reduction in H.P. consumption
OR — in lieu of H.P. savings —
a 30-50% increase in production

Right now, you can help yourself by letting us try this new grinding method on *your own material* in the MIKRO Laboratory. Test will cost you nothing, but it may solve your problem.

INVESTIGATE this opportunity today.

PULVERIZING MACHINERY COMPANY
24 Chatham Road Summit, New Jersey

MIKRO-PULVERIZER
ATOMIZER
Also Makers of the MIKRO-COLLECTOR

PRESERVE OUR HERITAGE: FAITH, FREEDOM & INCENTIVE

READING TEST . . .

Begins on page 270

comprehension 80%, your index would be:

$$\frac{304 \times 80}{100} = \frac{24320}{100} = 240$$

Now check yourself against this table of reading indexes: 400 or more (excellent); 300-399 (very good); 250-299 (fair); 200-249 (average), 150-199 (poor); below 150 (very poor).

This table of reading indexes is approximate only. It consists of estimates by experts at the Reading Institute, but has not been tested on a large group to establish accurate ranges. We'd be interested to hear how you made out, so we can check our estimates. A post card will do. Sign it or not, as you wish.—THE EDITOR

TO IMPROVE YOUR READING

The questions on your reading in this article (and on articles in the next several issues) test your ability on the most common type of reading. That's where you read to get the essential facts—not just skimming, and not reading to retain and digest every minute detail.

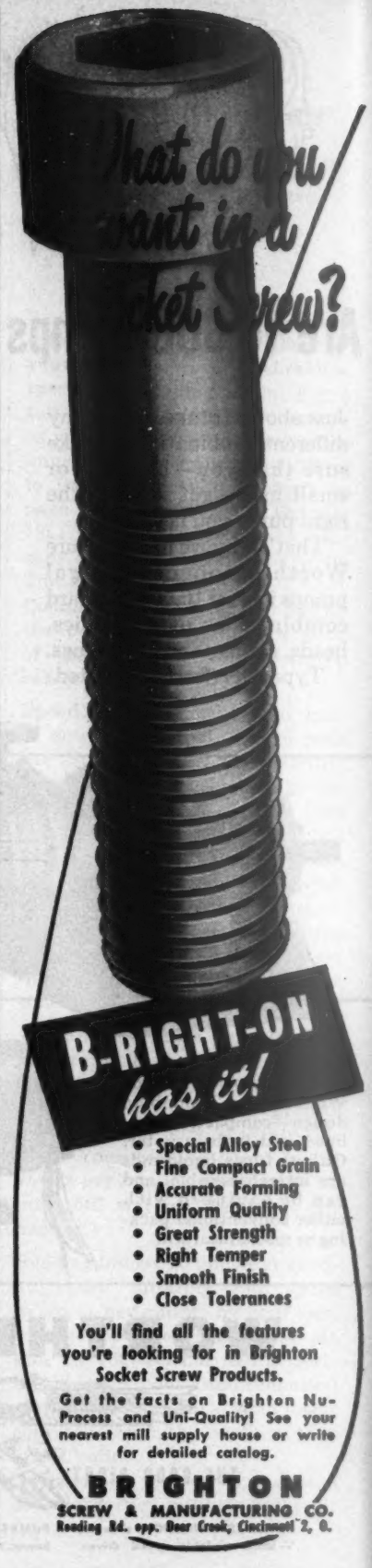
The way to improve is to push yourself to do this general type of reading more rapidly. Don't try to grasp every little detail. But don't skip over big ideas, either.

Time yourself now and then. Just estimate number of words.

Try to tell yourself what you have read. Go back over the article and check your own story. Then take another whirl at doing the same things.

Force yourself to read faster and faster as long as you are fairly successful in "telling yourself" the general content of the article. Follow this procedure faithfully for a while.

Compare the results that you get by taking the tests in FACTORY from month to month. You'll see a difference.


What do you want in a Socket Screw?
B-RIGHT-ON has it!
• Special Alloy Steel
• Fine Compact Grain
• Accurate Forming
• Uniform Quality
• Great Strength
• Right Temper
• Smooth Finish
• Close Tolerances
You'll find all the features you're looking for in Brighton Socket Screw Products.
Get the facts on Brighton Nu-Process and Uni-Quality! See your nearest mill supply house or write for detailed catalog.
BRIGHTON
SCREW & MANUFACTURING CO.
Reading Rd. opp. Deer Creek, Cincinnati 2, O.

HOW THREE PATTERN SHOPS USED DELTA TOOLS To Cut Costs, Up Production

DELTA BAND SAW IS HUB OF CLOSE-TOLERANCE PATTERN MAKING

Mueller Brothers Pattern Works, Inc., Waukesha, Wis.—In almost continuous use is a Delta 36" Band Saw, located in the center of the shop for easy access and maximum time saving. Close-to-the-line cuts eliminate much handwork; and long cuts are just as easy. Other Delta tools are equally suited to close-tolerance work.

SPECIALLY MOUNTED DRILL PRESS HEAD GIVES GREATER CAPACITY

Carlson Pattern Shop, Inc., Springfield, Mass.—A Delta 17" drill head, mounted on a special stand to accept large patterns, has been at work for more than 14 years in this pattern shop. Delta Drill Presses, used primarily for precision routing and surfacing, give the clean, smooth, finished surface necessary in close-tolerance-pattern making.

BAND SAW AND SANDER SHARE BASE IN THIS DUAL PURPOSE SHOP

Robert West Pattern Works, Rockford, Illinois—Unusual adaptability to making both straight cuts and complicated shapes make Delta tools ideal for this dual pattern making and cabinet manufacturing shop. Quality patterns for foundries and cabinets and similar items calling for ornamental woodwork—are produced on an equally efficient production basis.

There's a Delta Power Tool for Your Job-

WOOD OR METAL WORKING

53 MACHINES — 246 MODELS — MORE THAN 1300 ACCESSORIES

For Delta Dealers, see your Classified Phone Directory under "Tools."

DELTA POWER TOOL DIVISION

Rockwell

MANUFACTURING COMPANY

619N E. VIENNA AVENUE • MILWAUKEE 1, WIS.

STOP RUST

You can stop rust with RUST-OLEUM! An exclusive formula proved in a wide range of industrial and marine applications for more than 25 years. Its tough, pliable film dries to a firm rust-resisting coating that protects against rust—cuts maintenance costs—adds years of use to many metal surfaces, indoors and outdoors.

RUST-OLEUM may be applied over rusted surfaces without removing all the rust, assuring substantial savings in preparation time... It is only necessary to remove all the rust scale and loose rust.

Prompt delivery from Industrial Distributor stocks in principal cities. See *Sweets* for complete catalog and nearest source of supply, or write for complete literature on your company letterhead today!

Beautifies AS IT PROTECTS

FREE SURVEY: Place your rust problems in the hands of a RUST-OLEUM specialist. He will survey your plant for all rust problems, submit detailed recommendations, and make specific tests.

Available in many **COLORS,** aluminum and white

"Rigid Economy, Men"

RUST-OLEUM CORPORATION

2451 Oakton Street, Evanston, Illinois

Towmotor Mass Handling Triples Storage Capacity In Modern Warehouse
FT. WORTH, TEX.—(TNS)—Stacking heavy cases ceiling high has tripled storage capacity, and increased handling efficiency in the modern warehouse
Production Costs Cut 60% By Towmotor Mass Handling
INCREASED PRODUCTION IS RESULT OF TOWMOTOR MASS HANDLING EFFICIENCY
TRENTON, N. J.—(TNS)—Productivity per man-hour reached an all time high when a fleet of Towmotor Trucks
LATE BULLETIN:
Film, "What Makes It Tick," Acclaimed By Management
TOWMOTOR

The NEW TOWMOTOR . . . *industry's handling headliner!*

There's nothing but good news about handling costs when the NEW Towmotor line-up makes the headlines. Five new Towmotor models add greater-than-ever versatility to every phase of handling in America's most important industries. New features assure greater maneuverability; new design provides increased stability with full rated loads. Pneumatic, cushion or solid rubber tires provide speed with safety over any type of surface, inside or out. Capacities: 2,000-3,000 and 4,000 lbs. Complete details of the NEW Towmotor are clearly shown in a new 15-minute film, "WHAT MAKES IT TICK." It's available now for a showing in your office at your convenience. Plan now to see it. *Send the coupon today!*

CHECK THESE HEADLINE FEATURES

- Shorter wheel base increases maneuverability
- Larger tires assure easier handling
- Larger steer wheels for better control
- Quiet as a deluxe car
- Double Universal joint eliminates shock
- Heavy duty, air-cooled clutch
- Forced feed lubrication
- Specially engineered Towmotor transmission; 2 speeds forward and reverse
- Powerful hydraulic brakes
- Engineered for constant, 'round-the-clock service on heaviest lifting jobs

***SEND COUPON TODAY** for a showing of **"What Makes It Tick"** in your office. 15 minutes of helpful information with no obligation to you!*

Representatives in all principal cities in U. S. and Canada

TOWMOTOR
THE ONE-MAN-GANG ®

FORK LIFT TRUCKS and TRACTORS
RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

*How many people have you talked to about **Americanism** today?*

TOWMOTOR CORPORATION
Div. 5, 1226 E. 152nd St., Cleveland 10, Ohio

I want more information about the NEW Towmotors. I would like to see "What Makes It Tick" in my own office. Please send details.

Name_____

Company_____

Address_____

City_____ State_____

Keller Air Hoist with pendent control handles bar stock in steel warehouse

KELLER AIR HOIST for CONVENIENCE

The Keller Air Hoist is another "hand" — a powerful hand that picks up 300, 1000, or 2000 pounds —almost without human effort. Its variable speed lifting with pendent control gives the operator utmost convenience and control when handling heavy materials or parts.

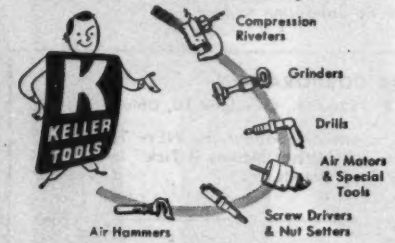
Keller Air Hoists have other advantages, too, such as light weight (30 lb*), small size (5" x 5" x 15"*), safety, and low maintenance.

*for 1000-lb Hoist. Capacities of 300 and 2000 lb are also available.

Air Hose Trolley

Keeps air hose conveniently suspended, permitting it to follow a trolley-suspended Keller Air Hoist.

Keller Air Hoists, Hoist Trolleys, and Hose Trolleys are available through Keller sales offices, or direct from the factory.



KELLER

Pneumatic Tools

KELLER TOOL CO., GRAND HAVEN, MICH.

For copies of books and booklets reviewed, write directly to publisher listed

BOOKS

For Industrial Relations and Personnel Executives

HUMAN RELATIONS IN SUPERVISION

By **Parker and Kleemeier.** McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N.Y. Index, bibliography of books and films, appendix of case studies. 472 pp. $4.50.

This is a book for the first-line supervisor, designed to show him how to deal with the human relations problems he constantly faces. The authors combine sound management principles and modern psychological theory to get their answers to the problems of worker training, motivation, and discipline.

The book stresses the supervisor's role as a morale-builder. Emphasis is on counseling the worker, and on understanding the causes of accidents and the effects of fatigue and monotony.

For Plant Engineers

HEATING DESIGN AND PRACTICE

By **Robert H. Emerick.** McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18. Illustrations, diagrams, tables, index. 453 pp. $8.

Here are the facts on the design and operation of steam, hot water, and warm air heating systems. The book covers steam generation, radiant heating, space heaters, fans, and filters. There's also plenty of background information on fields closely allied to heating equipment—combustion, fuel handling and storage, chimneys and stacks, incinerators, and refractories and insulation.

Turn the page

FOR *rugged three shift* LIFTING!

When lifting problems have you stumped, get a 'Load Lifter'! One of the "Series 700" 'Load Lifter' Electric Hoists. It's the one hoist you can depend upon for continuous service to keep defense and civilian production moving.

The 'Load Lifter' is a heavy-duty hoist. One that works a three-shift day, every day in the year. It's fast — lifts a 2,000-lb. load one foot in two seconds. There's only 24 volts at the push button for safety.

The 'Load Lifter' is made with a minimum of parts. Smooth, powerful hoisting and a long service life are assured by heat-treated helical gears and ball bearings throughout. Steel suspension, strong wire rope and overcapacity load hook guarantee safety. Operating and maintenance costs are scarcely noticeable.

Solve your lifting problems now — quickly, economically with a 'Load Lifter.' Your local "Shaw-Box" distributor will give you full information, or write us for Bulletin No. 399.

MAXWELL MM&M MANNING, MAXWELL & MOORE, INC.

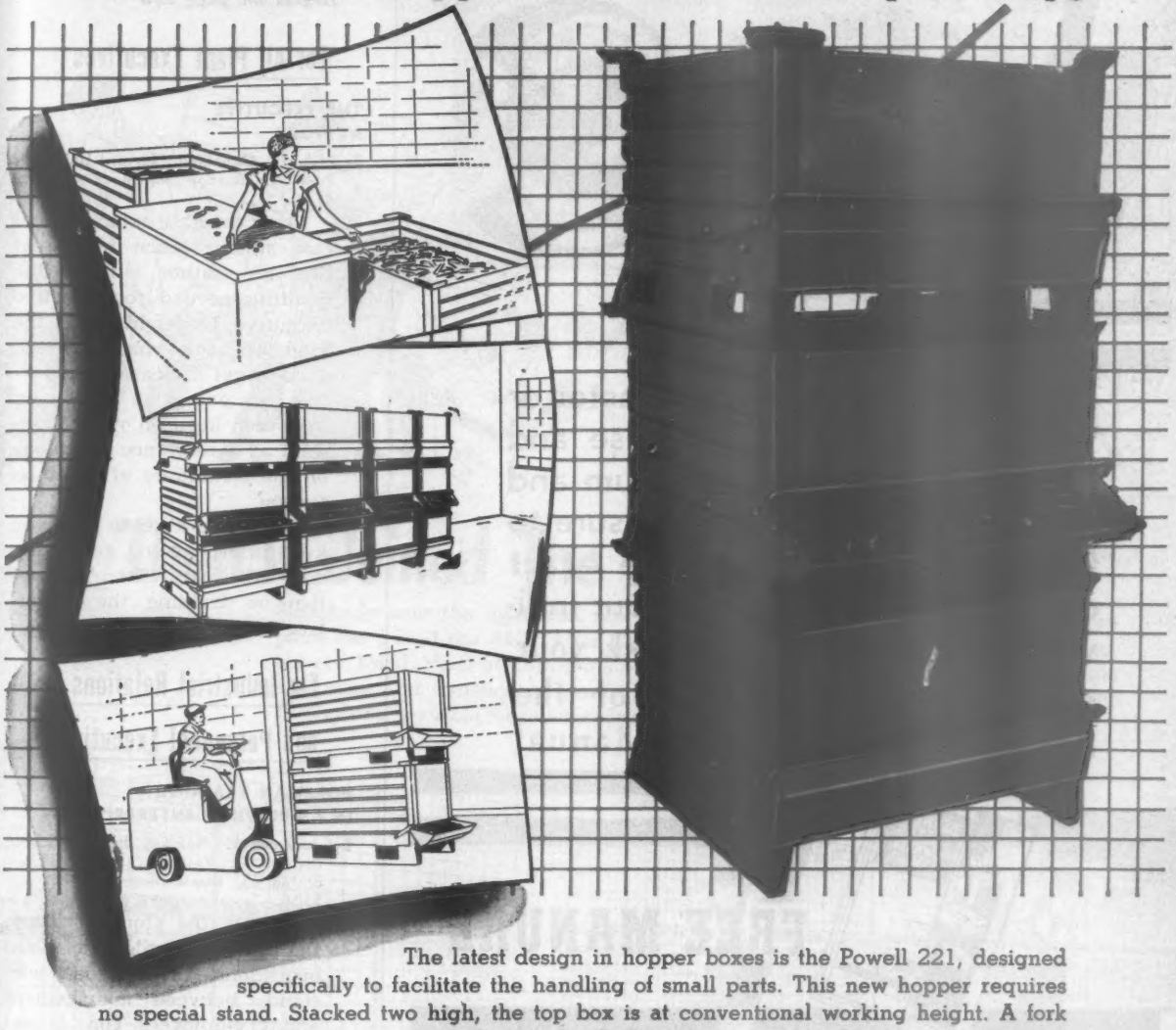
'Load Lifter' ® HOISTS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "Shaw-Box" Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, and 'American' Industrial Instruments.

HANDLING SMALL PARTS?

New POWELL Hopper Box Will Save up to 40%



The latest design in hopper boxes is the Powell 221, designed specifically to facilitate the handling of small parts. This new hopper requires no special stand. Stacked two high, the top box is at conventional working height. A fork lift can switch boxes in a matter of seconds. A three-stage, no-jam door opening permits worker utmost flexibility — can be left open for quick inventory checks. Funnel type stacking lugs means quick, safe spotting by truck operator. Hopper is available in two-way or four-way entry, straight or slanted gravity feed bottom.

The Powell 221 can be modified or new designs can be constructed to fill your specific job application — built to size and load capacity of your job requirements. For further data check your Powell representative or write direct.

Send Inquiries to Dept. 1121

POWELL PRESSED STEEL CO., HUBBARD, OHIO

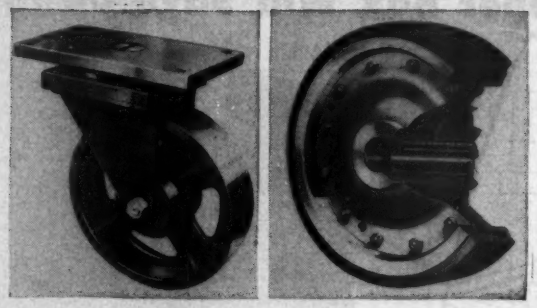
ORIGINATORS OF COLD FORMED ALL STEEL HANDLING EQUIPMENT

(In Greater Youngstown)

POWELL PRESSED STEEL

SINCE 1920

DARNELL CASTERS



There is a type of Darnell Caster or Wheel for every kind of use and floor. Made for light, medium and heavy-duty service, you are sure to find in the Darnell line the exact caster or wheel to meet your individual requirements . . . Ask your distributor for your copy of the new 192 page Darnell Manual

FREE MANUAL

Always SWIVEL and ROLL

DARNELL CORP. LTD. 60 WALKER ST. NEW YORK N.Y.
LONG BEACH, CALIFORNIA. 36 N. CLINTON, CHICAGO ILL.

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BOOKS

Begins on page 278

For All Plant Executives

THE EXECUTIVE AT WORK

By **Melvin T. Copeland.** Harvard University Press, Cambridge 38, Mass. 277 pp. $3.75.

Using concrete examples and case studies taken from real life, the author outlines the qualities needed for effective executive leadership. It's the kind of book you can read once to get a clearer perspective of executive problems. And then keep on your bookshelf as a reference handbook on the techniques of administration.

You'll find hints to help you keep informed and get things done efficiently. There's a section on training the executive's lieutenants.

For Industrial Relations and Personnel Executives

FOREMAN TRAINING IN A GROWING ENTERPRISE

By **A. Zaleznik.** Harvard Business School, Division of Research, Soldiers Field, Boston 63, Mass. Illustrated. 232 pp. $3.50.

This is the story of Tony, the man in the middle of plant operations—the foreman who stands between management and its employees. Tony is real flesh and blood, and probably typical of the foremen in your plant. In this book you'll see him in his daily contact with his bosses, Dan and Harry—the staff men, Fred and Dick—his group leaders, Dottie, Helen, and Jean—and the assembly line operators. You may come away with a clearer picture of what your foreman needs to know and how you should train him.

Turn the page

Inventory Was Tough In This Old-Time B.C.* Plant

★ Way back in the clumsy, wasteful days BC* (Before Cargotainers)—*the original, patented, palletized, welded wire containers*—this plant spent endless hours checking inventories. Even then, the results were often inaccurate because storage was neither visible nor efficient. The hubbub looked something like this:

Then It Joined The A.C.* Trend

Somebody saw the light and now the plant has joined the AC* (After Cargotainers) trend. Vertical storage is smooth and easy and conserves floor space. Everything is visible for quick checking. Moreover, all materials and parts stay right in their rugged collapsible Cargotainers as they move to assembly line and shipment. This modern AC plant now operates like this:

If by some chance, you are still BC why not let a Pittsburgh Materials-Handling Engineer show you how other plants have saved man-hours and storage space and increased efficiency by joining the AC trend. Write today to Dept. FM, Pittsburgh Steel Products Company, Grant Building, Pittsburgh 30, Pa.

The Steel Industry Needs Scrap—*Keep it Moving*

CARGOTAINERS

by Pittsburgh Steel Products Company

A Subsidiary of Pittsburgh Steel Company

KEEP PRODUCTION FLOWING... Get more Productivity with Powered Industrial Trucks

That's what companies all over the nation are doing to keep up with increasing Defense requirements. And here are some typical reports from users:

AUTOMOBILE GEAR AND AXLE PLANT

"On one operation, productivity per man-hour has increased 12½ times. Instead of handling 4,000 lbs. per man-hour by manual means, we now handle 50,000 lbs. with the aid of industrial trucks."

METAL PRODUCTS MANUFACTURER

"Since adding industrial trucks, production machines are kept constantly supplied with materials in such quantities that production downtime due to a lack of materials has been eliminated."

PUBLIC WAREHOUSE

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BOOKLETS

Begins on page 278

INDUSTRIAL USES OF RADIOACTIVE FISSION PRODUCTS. Stanford Research Institute, Project 361, Stanford, Calif. The government has been building up a large store of radioactive fission products. This report to the Atomic Energy Commission tells how and why this material should be released for wider industrial use. The report lists potential industrial applications, shows how they can be justified on a cost basis. There's a discussion of the handling problems involved, and an analysis of the effects of radioactivity on worker safety, insurance rates, and public relations. Illustrated, bibliography. 102 pp. $1.50.

DOLLAR SAVINGS THROUGH STANDARDS. American Standards Assn., 70 E. 45th St., New York 17, N. Y. Here's a convincing argument for standardization. Actual cases—140 in all—show how standardization in various phases of plant operation have paid off. Cases are indexed by industry and subject of standardization. 32 pp. $1.

HANDBOOK OF LABOR STATISTICS. Superintendent of Documents, Government Printing Office, Washington 25, D.C. An aid to the fact-finding process so widely used in labor-management relations today. You'll find the latest figures on employment, production, productivity, and wages for various industries. 239 pp., $1.25.

HOW TO BE CLEARED FOR HANDLING CLASSIFIED MILITARY INFORMATION WITHIN INDUSTRY. Superintendent of Documents, Government Printing Office, Washington 25, D.C. 10c.

Turn the page

User Reports . . .

N-B-M #397 SILVER BABBITT LASTS 5 TIMES AS LONG!

Large Portland Cement Plant used N-B-M Silver Babbitt on Crusher Bearings. Result? 400% *longer bearing life* . . . 30% *lower babbitt cost!*

The superintendent of this cement plant was—in his own words—"naturally skeptical" when quoted the low original cost of N-B-M #397 Silver Babbitt, compared to a tin-base babbitt then being used. But, later he writes: *"We are happy to say the #397 Silver Babbitt has already given us 4 to 5 times the service of the other metal. We believe the record speaks for itself."*

These big savings—*in both original cost and actual service cost*—are possible because #397 Silver Babbitt costs 30% to 40% less than tin-base babbitt—yet has these important features that insure easy handling and better bearing performance:

- **Retains hardness at higher temperatures**
- **Easy to bond**
- **Has high resistance to corrosion**
- **Embeds grit—even at room temperature**

N-B-M Silver Babbitt offers plant and product engineers this real challenge: *chances are that it can make important savings in your plants or products.* Investigate it now—write today for complete information and prices!

This folder gives complete facts . .

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BETTER RELATIONS THROUGH BETTER UNDERSTANDING. Association Press, 291 Broadway, New York 7. The proceedings of the 33rd Silver Bay Conference on human relations in industry. Papers and seminars cover a wide range of specific problems in industrial relations. 129 pp. $1.50.

ADVANTAGES OF THE GRAY IRON CASTING PROCESS AND PRODUCTS. Gray Iron Founders' Society, Inc. 210 National City- E. 6th Bldg., Cleveland 14. Discusses ways and means of improving your product and lowering its cost through the use of gray iron castings. Illustrations, bibliography. 28 pp. Members, $1; non-members, $1.50.

HANDBOOK OF EMERGENCY DEFENSE ACTIVITIES. General Services Administration, Washington 25, D.C. The latest information about all mobilization agencies. Includes rooms and telephone numbers of important officials. 30¢.

TOOL STEEL HANDBOOK. Steel Horizons, 532 Oliver Bldg., Pittsburgh 22, Pa. An Allegheny Ludlum handbook that explains the properties, applications, and forms of tool steels. There's a full discussion of heat treating and hardening techniques. And a set of weight and other reference tables. 196 pp. Free.

FLUIDS AND FACTS FOR METALWORKING. Standard Oil Co., 910 S. Michigan Ave., Chicago. A pocket-size handbook for men. There's a section on the selection and use of cutting oils and compounds, and another section of metalworking data. 64 pp. free.

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Warehouse of the Charles C. Lewis Company, Springfield, Mass.

● When it comes to choosing protective coatings, the Charles C. Lewis Company takes no chances. Before selecting the coating to be used on its new warehouse, four different coatings were tested—all made by reputable manufacturers.

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INDUSTRIAL FILMS

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TARGET U. S. A. tells your plant how to meet eight problems in the event of atomic attack. The 20-min. film shows how to protect plant and personnel, where and how to provide shelters, how to recruit a defense corps, and how to set up a control room and first aid station. 16mm. Sale price, sound color: $200; black and white sound: $100. From:

Cornell Film Co., Inc., 1501 Broadway, New York 18.

SPECIAL MACHINERY FILM follows the progress of automotive transmission parts through transferring and machining operations. It's a 16mm. black-and-white sound film. Runs 18 min. Write:

Special Machinery Sales Dept., Greenlee Bros. & Co., Rockford, Ill.

MINES ABOVE GROUND—all about scrap—was reviewed in FACTORY, November 1950. But today it merits a second mention. Shows the most advanced methods of reclaiming and re-using scrap. 16mm. 18 min. Write:

Association Films, Inc., 35 W. 45th St., New York 19.

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Do you have a film or films that might help management do a better job? Help employees learn their job faster, better? If so, tell us about it and we'll pass the information on to others.

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makes more important than ever the Specification of Lighting Units that meet

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for Efficiency, Durability and Uniformity

Vital to defense and essential civilian production, are lighting units that *can be depended upon* to provide the right quantity and quality of light, economically, dependably and with a minimum of servicing need and maintenance cost.

Defense production demands lighting equipment with the ability to *sustain its rated light output* efficiency over hundreds of cleanings so that the proper high illumination levels may be maintained. It demands the *durability* found so essential to industrial lighting and the avoidance of production interruptions and inefficiency due to abnormal wear, distortion or breakdown. It demands fullest *protection from glare* through proper diffusion and shielding.

All of these, and many other conditions for proper lighting of defense plants can be met through the specification of RLM-Labeled Lighting Units. All units bearing the RLM Label are warranted by Electrical Testing Laboratories to conform to the minimum standards established by the RLM Standards Institute for efficiency, durability and uniform quality.

FREE RLM BOOKLETS containing complete specifications for all RLM-Certified Industrial Fluorescent and Incandescent Lighting Units and the names of all manufacturers of RLM-Labeled Units may be obtained by writing: RLM STANDARDS INSTITUTE INC., Suite 829, 326 West Madison Street, Chicago 6, Illinois.

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DIFFUSION WITH HIGH REFLECTION FACTOR
RLM Porcelain-Enameled Steel Reflectors must have a mean reflection factor of 82% . . . an assurance of more light for the money. Porcelain enamel reflecting surfaces *diffuse* light from the lamp and help provide proper *quality* of illumination.

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RLM Reflectors are built of not less than .032" reflector steel covered with .025" fused on porcelain enamel that will not chip, corrode or deteriorate under industrial operating conditions.

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Reflector design of RLM Units conforms to specifications embodying approved practices of illuminating engineering.

HIGH POWER FACTOR BALLASTS
RLM Standards specify the use of certified ballasts which last longer, because they are designed to prevent excessively high temperature operation.

UNIFORM QUALITY
RLM Standards insist on the maintenance of uniform quality as to materials and construction, thus assuring the buyer of uniform lighting performance from each unit installed.

RLM STANDARDS INSTITUTE
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The letters RLM stand for Reflector and Lighting Equipment Manufacturers

R5516

FA POWER PLUGIN

The Midget Size Busduct, Now Available For Three Phase, Four Wire Service

FA Power Plugin, the midget size Busduct is the answer to today's demand for greater plant production efficiency. Available now for 4 wire 3 phase service, 3 wire 3 phase service and 2 wire, single phase. FA Power Plugin provides convenient plugin outlets all along the line, permitting machines to be moved in and out of production lines without slowing down or delaying operations.

FA Power Plugin provides 60 amp., main feeder capacity for ½ to 3 H.P. 240 volt motors, AC or DC, with conventional type fuses, and 7½ H.P. maximum with dual element fuses. In its new design FA Power Plugin also provides 208 volts single phase or three phase for power to motors, and 120 volts for light where individual illumination on machines is desirable. It also provides 120 volts for small pump motors on return lubrication systems.

Underwriters' Laboratories approved, FA Power Plugin is only 3½ inches wide and 2 inches deep in size. It is available in 5- and 10-foot sections with plug-in outlets every 20 inches; additional outlets on special order. Special lengths are also available for application on production benches and machines.

For further information on this new, convenient, flexible and efficient system of power distribution contact your nearest FA representative (he's listed in Sweet's) or write for Bulletin.

{ NEW Power Plugin FA Busduct is available to meet the need for greater capacities —225 to 1,000 amps, 600 volts. }

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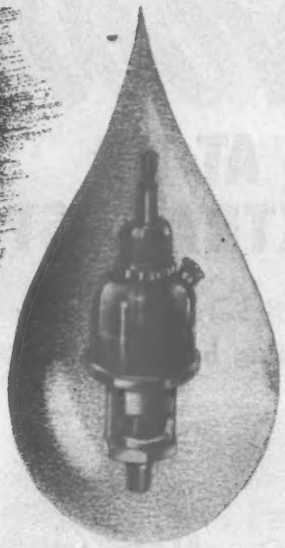

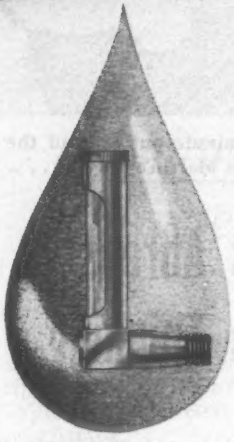

GITS Bros. covers the *entire range* of lubricating devices: Oil Hole Covers, Oil Cups, Grease Cups, Bottle Oilers, Gauges. Gravity-Feed, Wick-Feed, Constant Level, Vibrating Rod styles. Threaded or Drive-type. Elbow or Straight.

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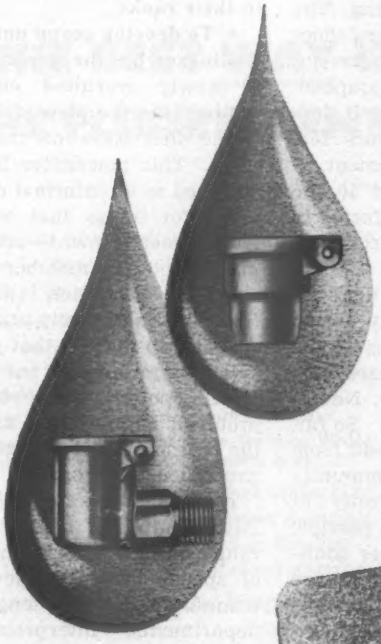

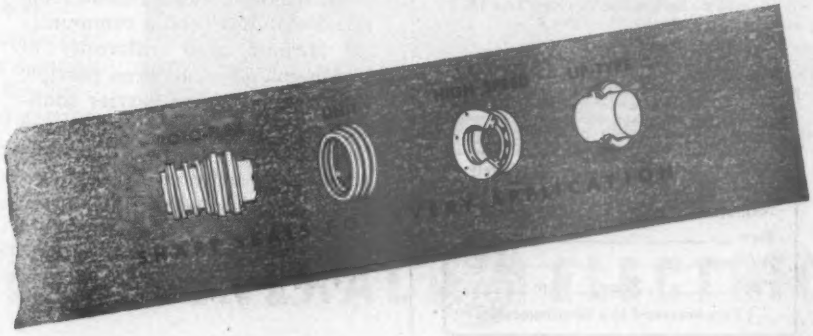

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100% Serrated Safety Grating by A. O. Smith

A. O. Smith 100% serrated safety floor costs no more than a plain surface floor. You get premium quality with *positive* safety protection—*at no premium in price!*

100% non-slip surface is assured when you use A. O. Smith Safety Grating. All bearing bars and cross bars are fully serrated.

Ask your purchasing agent, design engineer or safety director to get full details on this grating that assures maximum safety in any application.

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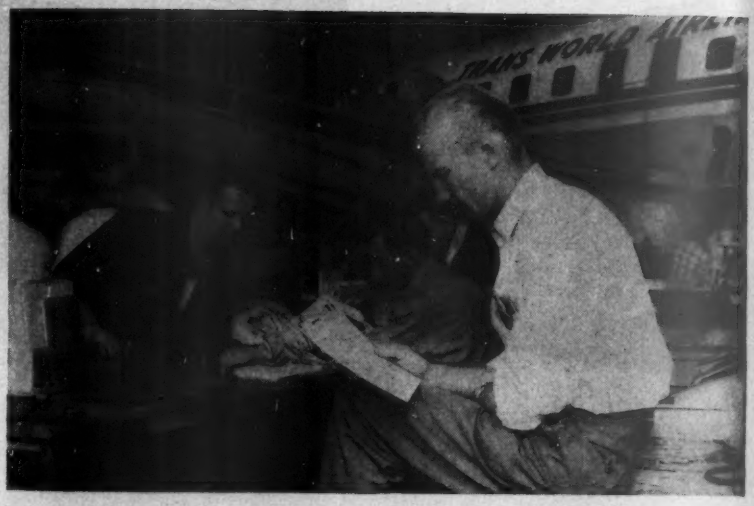


GLENN L. MARTIN FOREMAN takes a minute out to read the latest issue of *Memo to Management*. The *Memo* is Martin's way to . . .

. . . Keep Supervisors Abreast of Management's Thinking

IT'S TOUGH TO KEEP 1200 supervisors informed on what management's doing and thinking. The Glenn L. Martin Company does it with its *Memo to Management*. It's a 2-page, mimeographed, single-spaced fortnightly. It does a lot to make supervisors feel they "belong" to management.

Started in the spring of '50, the *Memo* today is a major factor in Martin's management - relations program.

The *Memo* gives identical information simultaneously to all management men. It tries to beat the grapevine. That's hard in a big plant, but necessary. Necessary, too, in small plants. So far, Martin says, a major benefit from the *Memo* has been a community of purpose and uniformity of judgment. This has been possible because the *Memo* carries confidential information from top management downward across the board—between departments and between separate plant areas.

The newsletter has a two-fold purpose:

- **To prepare management personnel to act effectively in absorbing additional supervisors into their ranks.**
- **To develop group unity in all dealings with the great number of newly recruited employees coming into the plant daily.**

The first issue of the *Memo* said: "This newsletter has been designed as an informal clearing-house for things that matter to Martin management—and therefore to you as a member of management. Its mission is to supply facts on the company and its operations, to the end that you may be kept continuously informed of Martin policies and objectives, problems and progress, as well as the reason behind changes in organization or program."

It has kept pretty close to that initial path. It carries a wide range of items, including: news of specific products, news from manufacturing and engineering departments, interpretation of rumors, sales developments, customer relations, production schedules and performances, company finances and backlogs,

The best time to catch rejects

Of course inspection work needs good lighting. Yet all you can do at this stage is *catch* mistakes that have already been made.

. . . is before they happen

How much better to *prevent* errors in the first place—and the losses that go with them—with proper lighting at the *production* level! Yet this is where 60% of today's plants are underlighted.

Photos courtesy Thompson Products Co., Cleveland, Ohio

THE BEST WAY IS WITH "5-WAY IMPROVED" G-E FLUORESCENT LAMPS IN YOUR FIXTURES!

AS a result of recent improvements made by General Electric lamp research scientists, you now get:

(1) Increased efficiency (improved phosphor)
(2) Better uniformity (improved processes)
(3) Less end blackening (purer materials, more accurate controls)
(4) Longer life (new materials and methods)
(5) Better color rendition (new Deluxe White lamps show colors as they really are)

Workers see better, work better under cool fluorescent light with less glare, fewer shadows. Newest form of fluorescent is G-E slimline—up to 8′ long, single pin base, instant starting.

Call your General Electric lamp supplier.

FREE BOOKLET! How to light up for better production. For your copy of "Planned Lighting for Industry," write General Electric, Department 166-F-11, Nela Park, Cleveland 12, Ohio.

You can put your confidence in—

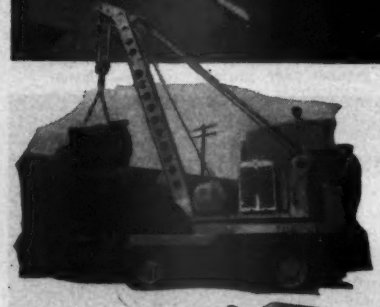
GENERAL ELECTRIC

for CONTINUOUS ELECTRIC POWER

Diesel-Electric Locomotives

READY-POWER-equipped ELECTRIC-TRUCKS

Loading a Box-car with Ready-Power Equipped Elwell-Parker Hi-Lift Platform Truck



Yale Crane Truck Equipped with Ready Power

Ready-Power-Equipped Automatic Fork Truck

Modern Diesel-electric locomotives and Ready-Power-equipped electric trucks operate alike. Both generate dependable electric power right on the vehicle; both operate economically; and both excel where long, continuous operation pays off. Your electric trucks will do more work at less cost when equipped with Ready-Power. There are models for every type, size and make of electric truck.

THE READY-POWER CO.

3820 Grand River Ave., Detroit 8, Michigan

KEEP SUPERVISORS ABREAST . . . *Begins on page 290*

manpower, training, security regulations, procurement and CMP regulations, plant engineering and maintenance, public and industrial relations.

Martin's supervisors like the newsletter. A questionnaire, circulated among readers, brought a 44% return. Comments were almost uniformly favorable.

Typical of reactions was the comment of one reader: "The *Memo* has helped to keep us informed about things that will affect us directly or indirectly — and along with this has made us feel that we are actually a part of management."

Another said:

"The *Memo* has squelched rumors or verified them. Has supplied information from top management down as it should be and not from outside sources. Now I have the information at least before the direct worker."

To be more specific on what the *Memo* has done: Turnover rate was running high last summer. The *Memo* published a list of suggestions as to how the supervisors could make newcomers feel more at home in their departments. In about a week turnover rate dropped 30%.

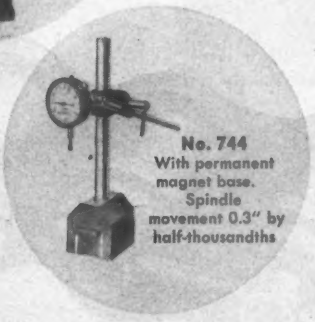
Also benefiting from the *Memo's* campaigns are such perennial subjects as employee relations, off-the-job education, safety, national security, and defense bond sales.

The newsletter is classified "Company-Confidential." It carries no military-classified information. But safeguards had to be set up by Martin with business and national security in mind. All items are reviewed before they are printed, to prevent release of information which might put Martin, its customers, or the Armed Forces in a compromising position.

Editing the *Memo* is one man's job. He's a rover, picking up notes from travels about the plant. His news sources are his review board.

No. 730
Tubular upright and lever-style clamps. Spindle movement 0.3" by half-thousandths

No. 731
Separate clamps for each movement. Spindle movement 0.3" by half-thousandths.



No. 744
With permanent magnet base. Spindle movement 0.3" by half-thousandths

No. 725
Dial Attachment
For use with vernier height gages and surface gages. Spindle movement 0.03" by thousandths

On-The-Job Accuracy Checks that Hold Production High

Brown & Sharpe Dial Test Indicators are an important aid to machinists in maintaining consistent accuracy at today's high production rates.

With minimum disturbance of work or loss of time, they provide quick, easy accuracy checks for flatness, concentricity, run-out, or innumerable other relationships. Especially valuable to set-up men, machine erectors, inspectors, or toolmakers.

In every respect, these Brown & Sharpe Dial Test Indicators are precision tools of the highest quality. All parts are carefully machined to give smooth, solid movement and easy, secure clamping. White enamel dial face and bezel may be turned to bring zero under hand in any desired position. Styles available with dial graduations of thousandths, half-thousandths, and ten-thousandths.

A wide variety of styles permits easy selection for all your requirements. Write for catalog.

Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

We urge buying through the Distributor

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Suppose you need UNION Machine Finished Steel Roller Chain...

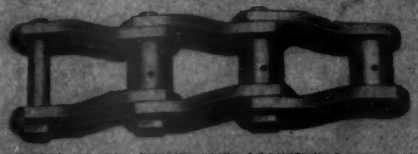
...and are certain of the pitch, length and sprockets required. Just write or phone your nearest Union Chain Stock Carrying Distributor listed on the facing page. He will make every effort to ship your requirements promptly.

...*or suppose you need* engineering assistance in the selection of a drive or a recommendation for a conveyor application. Talk or write to Union Chain's nearest district office as listed at the top of the facing page. You will receive unprejudiced, competent help.

Unprejudiced because Union Chain makes all types of steel sprocket chains and is interested in providing each customer with the correct chain for satisfactory service at minimum cost.

Competent because Union Chain representatives are qualified through experience to make sound chain recommendations whether the application calls for roller chain, silent chain or one of the various heavy drive or conveying chains. We suggest it might profit you to discuss your chain problems with us.

UNION SILENT CHAIN



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Portland 14, Oregon

PENNSYLVANIA
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Plymouth, Pennsylvania

Wayne Ritter
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Pittsburgh 16, Pennsylvania

Union Chain & Mfg. Co.
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Philadelphia 2, Pennsylvania

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Union Chain & Mfg. Co.
J. H. Castleberry
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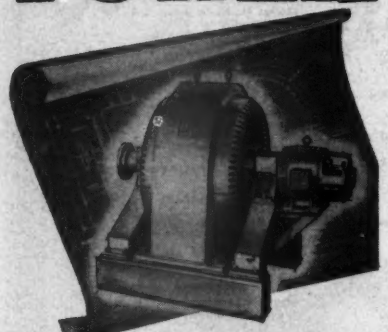

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LETTERS TO THE EDITOR

How Much Do Consultants Help on Materials Handling Problems?

Dear Mr. Waddell:

I feel very keenly that many firms are missing large possible savings in materials handling by doing the job themselves. I have seen some of the costly mistakes, the half-done jobs (and not confined to small companies, either).

In the report on materials handling in your May 1951 issue, the dialogue between Joe and Fred seems to miss this point. (Otherwise it is a good article.) You are suggesting that a tyro named Joe make his own materials handling survey. Oh sure, he can do it—I have seen 'em.

It is a firm conviction of mine that no layman should attempt to set his own broken leg.

To get back to your report: Do you actually believe that the persons who got the company into the morass of faulty handling (or, who have left them in it), are qualified to lead the outfit out?

There are several good consulting firms specializing in materials handling. Don't they fit into this picture in some way? I have good reason to know that some (if not all) of the firms you feature in case studies in this May 1951 report used handling consultants.

In any event, all poor Joe has to do is to miss the *correct* answer to one of his problems by as little as 10% (and boy, do they miss 'em) and his company will pay some good consultant's fee—from now on and on.

E. V. MORROW
THE E. V. MORROW ORGANIZATION
CAMBRIDGE, MASS.

• *Mr. Morrow's letter prompted us to do some research into the source of industry's ideas and engineering for improvements in materials handling.*

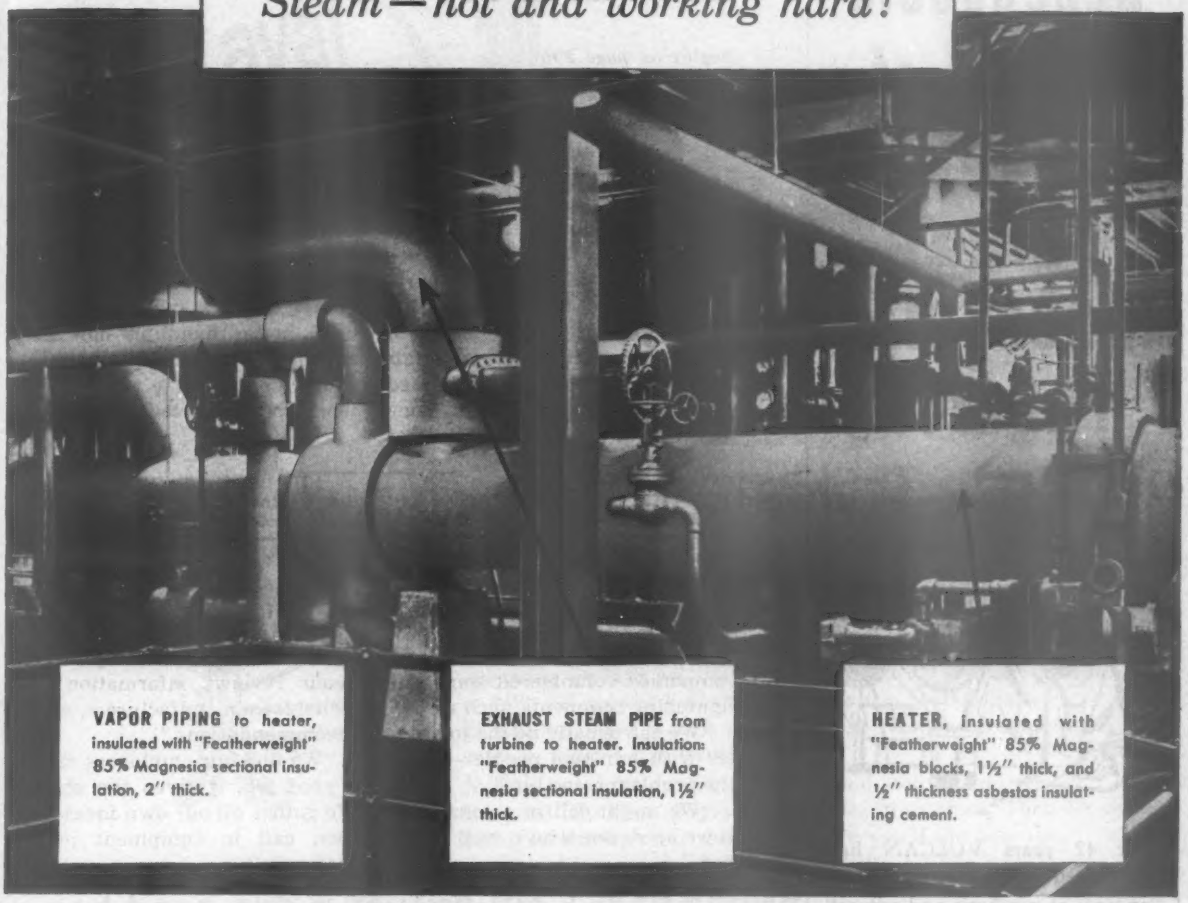
First, we asked the 10 companies that contributed the case studies in our May 1951 report to tell us who was responsible for the handling improvements described. Here's a summary of what they said:

THE COMPANY	People Responsible for the Project		
	Employees in various departments	Handling equipment mfrs.	Consultants
Ohio Rubber Co.	•		
Baker-Raulang Co.	•		
Bigelow-Sanford Carpet Co.	•(1)	•	
E. F. Hauserman Co.	•		
Formfit Co.	•	•	
Standard Railway Equipment Mfg.	•	•	
General Electric Co.	•	•	
Jeffery Mfg. Co.	•	•	•(2)
Aluminum Cooking Utensil Co.	•	•	
Bridgeport Brass Co.	•	•	•(3)
TOTAL	10	7	2
PER CENT	100%	70%	20%

(1) Author A. O. Huck said, in part: "The engineering group in the plant develops the type of improvement described in the article. When we run into 'sticky' problems, we consult experienced headquarters staff engineers."

(2) Author J. H. Garard told us: "Our methods and layout group develops new methods, but

Steam—hot and working hard!



VAPOR PIPING to heater, insulated with "Featherweight" 85% Magnesia sectional insulation, 2" thick.

EXHAUST STEAM PIPE from turbine to heater. Insulation: "Featherweight" 85% Magnesia sectional insulation, 1½" thick.

HEATER, insulated with "Featherweight" 85% Magnesia blocks, 1½" thick, and ½" thickness asbestos insulating cement.

These Keasbey & Mattison Insulations keep heat on the job—keep heating costs down!

Steam is expensive to produce . . . and far too valuable to waste. That's why "Featherweight"® 85% Magnesia was the insulation used in this large Southwestern utility plant.

"Featherweight" 85% Magnesia gives maximum protection against heat loss—keeps steam "on the job" wherever and whenever it's wanted!

This is but one of thousands of installations of "Featherweight" 85% Magnesia Insulation—on ships, in power plants, in the chemical process and food industries. With a background of more than 60 years' service, "Featherweight" is today one of the most widely used and favorably accepted insulations for temperatures up to 600° F. When used in combination with K&M Hy-Temp Insulation, "Featherweight" 85% Magnesia is efficient and practical for temperatures up to 1900° F.

Ask your distributor, who is also an experienced applicator, for complete information on "Featherweight" 85% Magnesia, or any insulations in the complete K&M line. Or, write us.

The newest development in thermal insulation: "KaytherM" High Temperature Blocks

A product of years of research and development! "KaytherM" provides maximum efficiency up to 1500° F. It is molded to size . . . incombustible . . . insoluble in water . . . has exceptional strength and high dimensional stability . . . is light in weight . . . easy to handle . . . quickly applied. Available in flat blocks 6" x 36"; in thicknesses of 1", 1½", and 2".

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LETTERS . . .

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they utilize every possible source of help—including consultants. They are usually engineers within the company who are specialists on specific types of equipment."

(3) Author P. L. Clark reported: "We used the services of a consulting firm for a period of time. They studied our materials handling problems, recommended changes and improvements, some of which we adopted. At all times we use the services of our engineering department. We frequently call on the handling equipment manufacturers for advice. Another excellent source of ideas is trade periodicals."

Then we asked 15 other companies that we knew had developed better handling how they approached a materials handling problem. Here's a summary of what they reported:

People responsible for project	1st choice	2nd choice	A Combination	Total No.	%
Employees —various departments	8	2	4	14	93%
Handling equipment manufacturers	3	5	4	12	80
Consultants		1		1	7

The plant managers of these 15 companies volunteered some enlightening comments, such as:

"We can usually do the job better with our own people—unless the problem is too big."

"We might call in a consultant if we knew one who is well qualified."

"A committee of department heads reviews information collected from manufacturers, makes recommendations."

"We find our employees can do a good job, if given the chance. We gather all our own ideas first, then call in equipment manufacturers."

American Industry Depends on All Nations

Dear Editor:

The other day I visited a mattress factory. And when I saw items going into the make-up of mattresses coming from such a wide range of places—hemp from the Philippines, cotton from China, twine from Italy — it brought home to me how dependent nations are on each other.

That started a chain of thoughts in my mind. We are keenly aware of the differences that keep peoples apart—headlines and stories in the newspapers every day tell of them.

But the rank and file of Americans are tragically ignorant of fundamentals that weld peoples together.

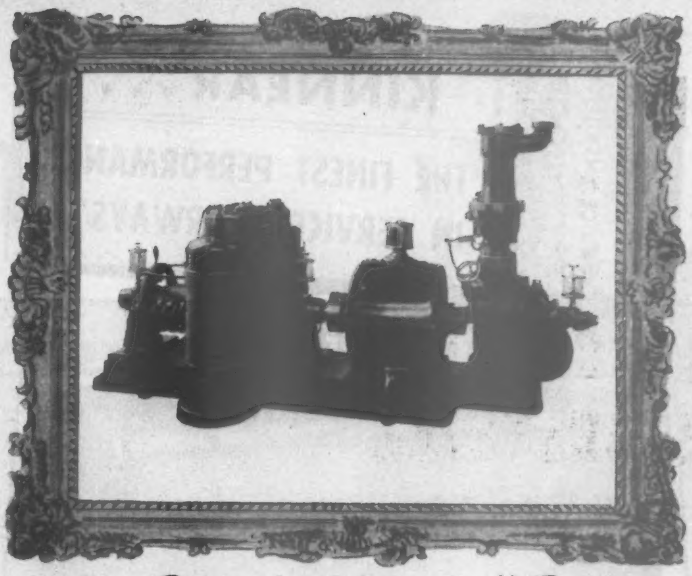
We would be lost without our morning cup of coffee and our demitasse in the evening—without tea, cocoa, Scotch whiskey, Rhine wines, Chianti, liqueurs—olive oil for our salad—dates, bananas, pomegranates, Brazilian and cashew nuts—stout Egyptian cotton—silk from Italy and the Orient—Irish and Italian linens —and many more.

The significance of this interdependence is not headlined in our newspapers, and is not realized by the average American. He reads a lot about "isolationism," which has a certain appeal to the patriotic spirit. That is very bad. For, unfortunately, the man in the street takes isolationism at its literal meaning—"going it alone."

We can't "go it alone." We don't. We never have.

What would we have done without Lafayette in the Revolutionary War? What would we

De Laval Turbines at work!



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The first turbine-driven generating set to produce current on a commercial scale in the United States was this De Laval unit installed at the Chicago World's Fair in 1893. Grandad was a fast man in his day too . . . he delivered 10 hp at 24,000 rpm. Just four years later, four De Laval 100 hp turbine generators operating at 2840 psi, 750° F and two 50 hp turbines operating at 1420 psi supplied all the power for the Stockholm Exhibition. That is high pressure, high temperature operation even by today's standards!

Next time you're in our neighborhood stop in and see Grandad. He is on display in our reception room. Then let us take you through our shops . . . there you'll see how the finest turbines in the country are built.

and here are a few of his Grandsons—

7500 KW De Laval turbine generator installed in the municipal power plant of the city of Lubbock, Texas. The 15 stage turbine is designed for 600 psi, 825° FTT.

This 11,500 KW De Laval turbine generator and another just like it will soon be supplying power for one of our key Naval bases.

Power for a New England textile mill is generated by these three 1000 KW De Laval geared turbine generators.

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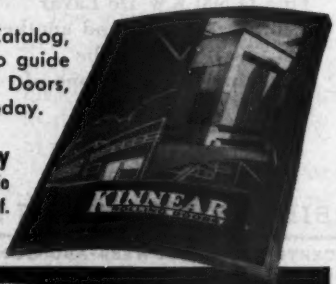

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LETTERS . . .

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have done without our Allies after Pearl Harbor? Why did we not only ally ourselves, but initiate the alliance, with 60 other nations in the United Nations organization? Why have we armies in Europe and Korea? Why do we maintain ambassadorial, consular, economic, and social relations with other nations? Why do we buy things we need from other nations? Why do they buy things they need from us? Because "all nations are interdependent."

That is the fundamental, inescapable fact which the man in the street does not fully realize. And the wide publicizing of the policy of "isolationism" is definitely responsible for that. He is ignorant of the fact that that word is used to describe opposition to bilateral political or military alliances with other nations. To isolate means *"to place in a detached or isolated situation."* Some other word must be found to properly describe that opposition. "Isolationism" should be deleted from our language. It simply doesn't belong.

Something should be done to get home to the rank and file of Americans the truth of our interdependence.

Facts speak louder than tons of literature. Charts, for example, set up in the mattress factory of which I spoke, showing from what foreign countries come the items that go into the making of American mattresses, would graphically tell the workers the story of our interdependence. If this were done in all plants, to show the source of basic items going into the plants' finished product—if stores displayed posters or charts explaining the source of component parts of the merchandise on sale—our inderdependence, not "isolationism," would be brought home to millions of Americans.

HARRY L. HARRISON
THE MILLER COMPANY
MERIDEN, CONN.

This man...

SOLVES YOUR INVENTORY PROBLEMS

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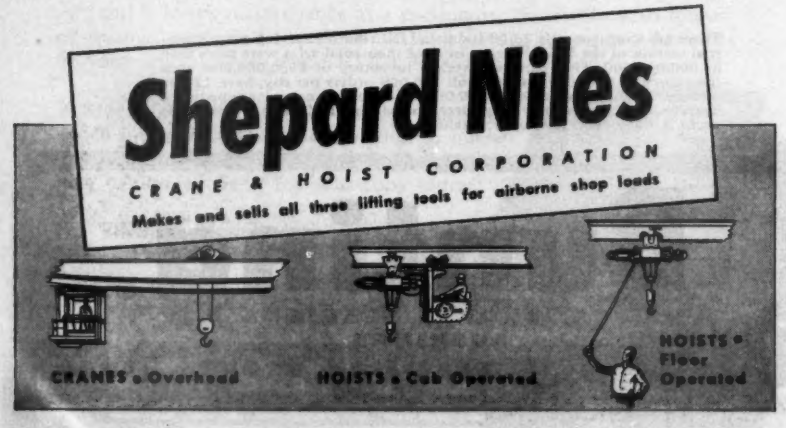
You can do this and avoid costly production slow-downs later if, before you buy, you estimate what the maximum and average loads are to be; how frequently your hoist will be called upon to handle those loads within a given period.

You will also want the answers to these questions: What distance is the load to be lifted and lowered, and at what speeds? How quickly must the hoist travel from one location to another to keep production at top efficiency? What temperatures are likely to prevail? Are there any corrosive influences? . . . and many others.

You can save your time now, and considerable trouble later, by asking a Shepard Niles specialist to study your problem and recommend the most economical hoist for you—in terms of your own specific operations. We invite your inquiries.


Shepard Niles
CRANE & HOIST CORPORATION
Makes and sells all three lifting tools for airborne shop loads
CRANES • Overhead
HOISTS • Cab Operated
HOISTS • Floor Operated

364 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

BEHIND THE BYLINE

Meet some of the men in industry who wrote articles for this issue of FACTORY.

CARMEN PROZILLO, who has been with General Aniline Works for six years, is responsible for all electrical maintenance, electrical repair, and electrical specifications at the plant. He tells about planned maintenance, page 104.

D. H. BAUM is superintendent of the quality control department at Westinghouse Electric & Manufacturing Company's Elevator Division, Jersey City, N. J. He's been with the company for 25 years. See his story on page 74.

JAMES T. DUFFY, JR., has been president of the Riverside Metal Company since 1949. He's a well-known plant consultant. He tells on page 92 how to start a simple cost control system.

Turn the page

American Blower...a time-honored name in air handling

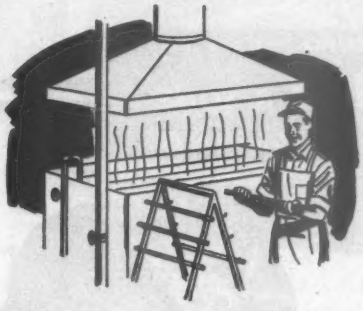
Richmond, Va., has a conveniently located American Blower Branch Office to provide you with data and equipment for air handling. You can reach American Blower in Richmond by calling 7-5630. In other cities, consult your phone book.

YARN ABOUT YARN . . .

A textile manufacturer was continually changing pulleys or setting the machine rate on his ring-spinning frames to fit the material that worked at the lowest speed. He'd heard about American Blower Gyrol Fluid Drives and decided to try them. Results were amazing. Gyrol Fluid Drive permitted a higher output within safe limits of the material, allowed spinning frames to start gradually with less yarn breakage. For your business, wouldn't smooth power transmission and adjustable speed control be a distinct advantage?

FOOD FOR THOUGHT . . .

Those magnificent new supermarkets springing up around the country are just as comfortable as they are modern. Many use American Blower Ventura Fans for ventilation the year round, and Venturafin Unit Heaters for winter heating. They meet a twofold requirement. First, both units are beautifully styled to harmonize with modern designs. Second, both units are quiet-operating – a necessity in modern stores. Our nearest branch office will be glad to furnish price and delivery data.



FUMES, VAPORS, GASES . . .

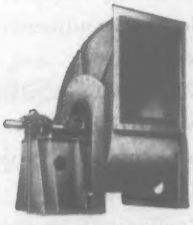
In addition to a wide range of standard ventilating equipment for industry, American Blower also offers special fans to handle corrosive gases, fumes, vapors. Some corrosive gases are vital to process work and must be circulated in the system with corrosion-resistant fans. Gases and fumes which affect the health and comfort of employees must be removed. There is an American Blower corrosion-resistant fan that will meet your requirements for those special applications in the process industry.

Whatever your needs, American Blower heating, cooling, drying, air conditioning and air handling equipment will improve over-all comfort and efficiency in your business. For data, phone or write our nearest branch office.

Unit Heaters

Ventura Fans

Air Conditioning Equipment



Industrial Fans

Utility Sets

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

YOUR BEST BUY **AMERICAN BLOWER** AIR HANDLING EQUIPMENT

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • ACME CABINETS • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • BOSS HEATER • TONAWANDA IRON

RHOADS Tannate UNI-PULL DRIVE

FOR TROUBLE-FREE POWER TRANSMISSION

Every second, every minute, every hour —year in and year out—Rhoads Tannate UNI-PULL Drive assures smooth, consistent transmission of power. The pivoted motor base automatically maintains the proper belt tension regardless of fluctuating load conditions . . . and Rhoads Tannate Leather Belting, with its superior gripping surface that results from our exclusive tanning process assures long, trouble-free performance.

Write for Rhoads Tannate UNI-PULL Drive Manual.

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Give 'em the BUM'S RUSH!

Don't let Dirt, Dust, and Grit spoil the working efficiency of your machinery and equipment. Rush 'em out of every crack and crevice with a CLEMENTS - CADILLAC blower-suction cleaner. Easy to use, economical. Ask your mill supply dealer.

Eligible under C.M.P. regulations.

Made in 5 models. *Illustrated:* Model "HP" with 2-speed control.

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CLEMENTS-CADILLAC

Portable Electric COMBINATION BLOWER-SUCTION CLEANER

CLEMENTS MFG. CO. 6634 S. NARRAGANSETT AVE., CHICAGO 38, ILL.

ASK YOUR MILL SUPPLY DEALER OR WRITE US FOR DATA

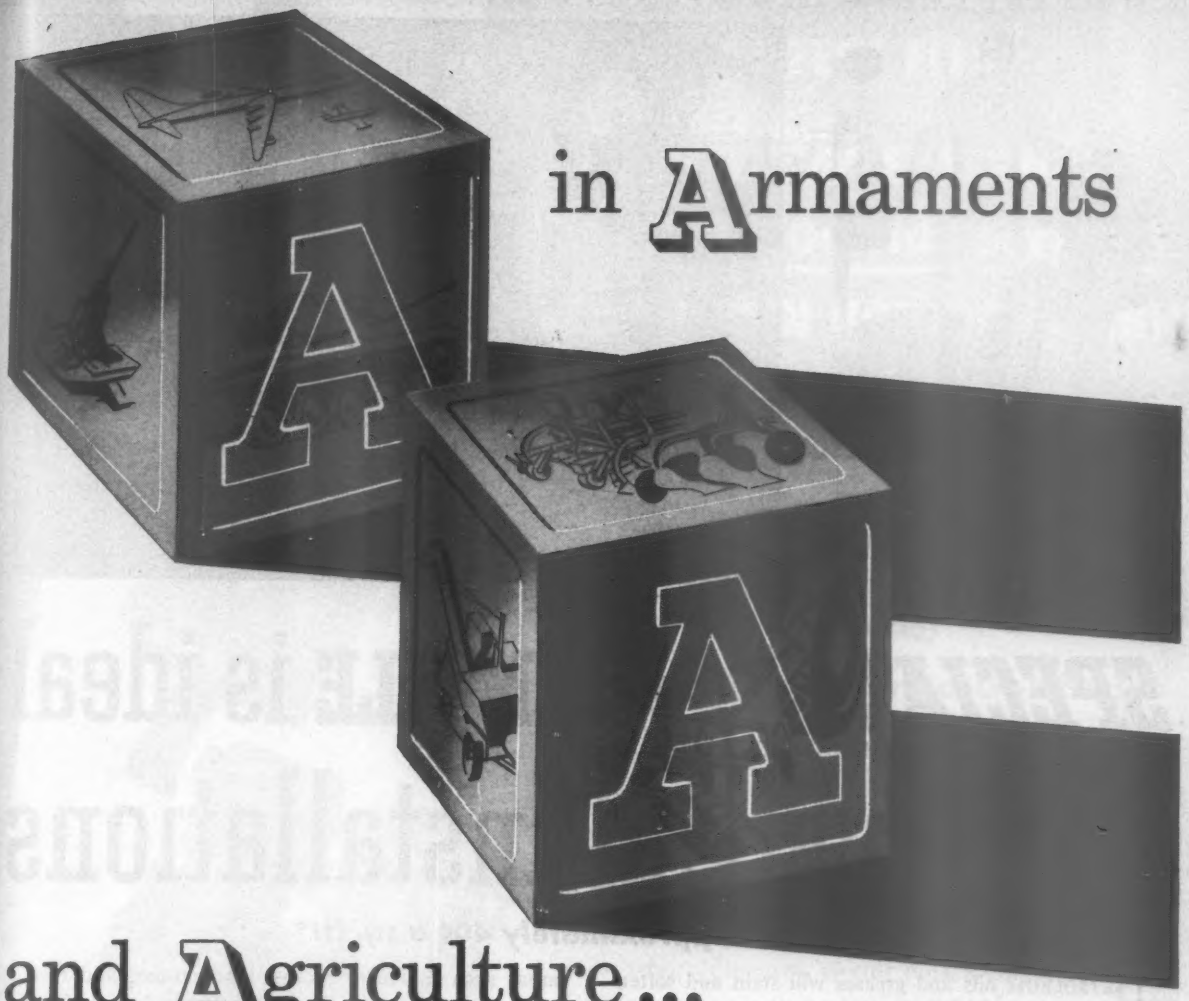
BEHIND THE BYLINE

Begins on page 302

CHARLES E. BARRETT has selected and supervised the installation of automatic lubrication equipment on more than 80 production machines for Alexander Smith, Inc. (page 82). He's been with the company for 24 years, is now director of engineering.

PAUL BLACK has been with Cleveland Pneumatic Tool Company since 1942, holding down various positions. He's now director of public relations. He gives his ideas on efficient employee recruiting, page 94.

DR. WILLIAM D. GLENN, JR., is director of the Reading Institute and Testing and Advisement Center, New York University. He heads the staff that is preparing monthly reading tests for those who wanted to know more about reading faster and better (FACTORY, October 1951). First test is on page 270, this issue. Try it.



in Armaments and Agriculture...

GAS plays its vital role

The essential tasks performed by Gas in both agricultural implement and armament manufacturing, are the basic heat processing applications in metals, chemicals, and ceramics where this versatile fuel has become an indispensible tool in the production line.

The simplicity and the flexibility of Gas Equipment which make it so readily adaptable to the most complex or the simplest heat treating requirements, are also reflected in the cost of fuel and equipment.

Whether you're manufacturing implements for agriculture or materiel for the armed services you'll find the productive flames of Gas can be applied at the heat processing stages in every production line—just as Gas is being used thruout industry for—

- Powder Metal Sintering
- Fusing
- Billet Heating
- Bright Annealing
- Brazing
- Core Baking
- Carburizing
- Polymerizing
- Normalizing
- Batch Melting
- Case Hardening
- Finishing

By every standard of comparison Gas is the ideal fuel for industrial process applications. The automatic controllability of Gas at any temperature, is just one of the features worth investigation. Be sure to ask your Gas Company Representative for information about applying Gas and Modern Gas Equipment.

AMERICAN GAS ASSOCIATION • 420 LEXINGTON AVE., NEW YORK 17, N. Y.

HERE'S WHY MAINTENANCE MEN SAY

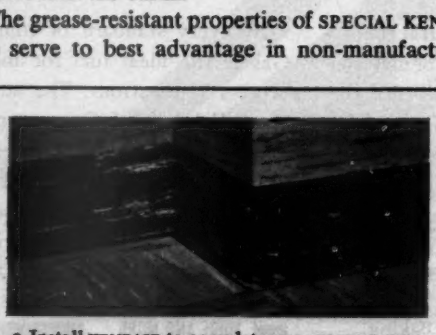
SPECIAL GREASE-PROOF KENTILE is ideal for industrial installations

and costs approximately 40¢ a sq. ft!*

PETROLEUM oils and greases will stain and soften many floors . . . but not SPECIAL KENTILE! And it's impervious to alcohols, alkalis and most acid solutions. Of course, like regular Kentile, it can be installed any place . . . over smooth concrete, wood or metal floors . . . even below grade on concrete in direct contact with the earth.

The grease-resistant properties of SPECIAL KENTILE also serve to best advantage in non-manufacturing areas such as locker rooms, lunch rooms and rest rooms where industrial wastes tracked underfoot cause floors to stain and soften, resulting in all-too-regular repairs or replacement. SPECIAL KENTILE provides years of trouble-free wear and minimum maintenance expenses no matter how hard the usage.

SPECIAL KENTILE now comes in new lighter, brighter colors to help create the cheerful atmosphere that means increased efficiency.



• Install KENBASE to complete your SPECIAL KENTILE floor. It goes directly against any smooth wall where it meets the floor area and seals dirt-catching cracks and crevices. You need never paint it and scuff and mop marks won't show.

*Prices for Special Kentile for ⅛" thickness may be considerably lower or slightly higher depending upon the size and condition of your floor and the freight rates to your city. Ask your Kentile Dealer for an estimate for *your* floor. He's listed under FLOORS in your classified phone directory. In Canada, at T. Eaton Co., Ltd.

KENTILE.

The Asphalt Tile of Enduring Beauty

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PERFECT PINS + PERFECT HOLES = PERFECT FITS

SUNNEN EXTERNAL HONES For Outside Surfaces and SUNNEN HONING MACHINES for the Holes—

Four external hone sets handle complete range from .120" to 2.750"

It's the New Way to Get Exact Fits Without Lapping

Now, with Sunnen *External* Hones you can match the precise accuracy and exceptionally smooth surface finish produced by Sunnen Internal Honing. These new hones *for outside surfaces* are ideal for finishing parts such as valve pistons, pins, arbors, plungers, ejector pins, spindles and shafts. Diameter range is from .120" to 2.750".

Sunnen External Hones are the *only* external hones with extension holders designed for removing heat treat warpage. Defects such as waviness, warpage, out-of-round, and centerless grind patterns are corrected quickly and with minimum stock removal. Accuracy is guaranteed to within .0001"—can be held to a few millionths on some jobs.

TYPICAL APPLICATIONS

Needle Valve Metering Rod Valve Spool Ram

To find out more about the benefits of using Sunnen External Hones in your plant, send the coupon for FREE illustrated booklet.

To: SUNNEN PRODUCTS CO.
7959 Manchester Ave., St. Louis 17, Mo.

☐ Please send bulletin on external honing. ☐ Have representative call.

Name.....

Company.....

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City.....Zone.....State.....

SUNNEN PRODUCTS COMPANY
7959 Manchester Avenue • St. Louis 17, Missouri
Canadian Factory: **Chatham, Ontario**

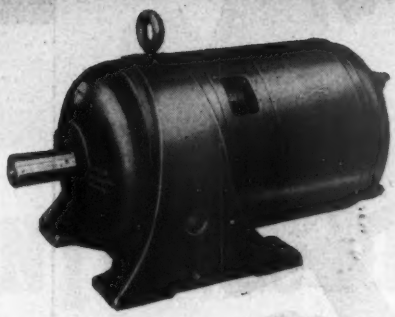
FOOTE BROS. *Enclosed Gear Drives*

HIGHEST IN QUALITY • SUPERIOR IN PERFORMANCE

WIDE RANGE OF TYPES AND SIZES

Enclosed Gear Drives—a size and type to meet every application. The latest in gear-cutting equipment backed by nearly a century of engineering and manufacturing experience. New techniques, better control of material, improved manufacturing methods—all assure superior enclosed gear drives.

LINE-O-POWER STRAIGHT LINE DRIVES
Available for prompt delivery
High quality Duti-Rated Gears permit maximum power in minimum size. These drives are economical, both in original cost and operation. Double or triple reductions with ratios from 5 to 1 up to 238 to 1 and capacity range from 1 up to 200 h.p. Write for Bulletin LPB.



FOOTE BROS.—LOUIS ALLIS GEARMOTORS
Available for prompt delivery
Duti-Rated Gears with file hard tooth surfaces and resilient cores assure long wear life and maximum load-carrying capacity. Wide range of highest quality motors in open drip-proof, splash-proof, enclosed and explosion-proof types. Write for Bulletin GMA.

HYGRADE HORIZONTAL WORM GEAR DRIVES
Available for prompt delivery
High in quality, compact in design, incorporating precision worm gearing. Available in a wide range of types to meet any need. Ratios from 4⅛ to 1 up to 4108 to 1. Capacities up to 260 h.p. Write for Bulletin HGB.

HYGRADE VERTICAL WORM GEAR DRIVES
Available for prompt delivery
Vertical output shafts extended either upward, downward, or both. Also available in Hytop design with wider low speed bearing span to accommodate vertical output shaft extensions. Ratios 4⅛ to 1 up to 4108 to 1. Capacities up to 260 h.p. Write for Bulletin HGB.

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Better Power Transmission Through Better Gears

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GEAR AND MACHINE CORPORATION
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packaging headquarters
for government specified materials

The large unretouched photograph above displays a package that has been coated with government specified JAN-P-115 Amber by the dip-seal method. Note the complete legibility of the label.

This is but a single example of the Dearborn line of government specified packing materials that are uniform in quality . . . easy to apply to the products you manufacture. Whether your government orders require rust preventives, case liners, fingerprint neutralizers, wrappers and sealers, Dearborn has them. And, in addition, a Dearborn packaging engineer will gladly visit your plant and help you plan your packaging operation.

This service is designed for any manufacturer . . . but particularly for those with government contracts for export shipment. The coupon is for your convenience.

THIS BOOKLET WILL HELP YOU

The new edition of "Preventing Corrosion in Export Packaging" gives you: (1) current government specifications; (2) cleaning methods; (3) approved packaging methods; (4) how to apply rust preventives; (5) how to wrap, seal and dip parts; and (6) other valuable information with step-by-step picture stories. Write for it today.

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IRON + OX = RUST

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☐ Please send a copy of "Preventing Corrosion in Export Packaging."

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YOUR HELP IS NEEDED

to get in the

DORMANT SCRAP

At current steel production rates, 50% MORE SCRAP is needed than in the peak year of World War II. The shortage is so real that steel company representatives are calling on every company in the country to find ways of relieving the situation.

Here's How YOU can help

1. **Take a fresh look at your own plant scrap and salvage activities.**
2. **Call in your dealer—sell your scrap—NOW!**

WSD 3886

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Doors that open...

...close AUTOMATICALLY

...speed traffic

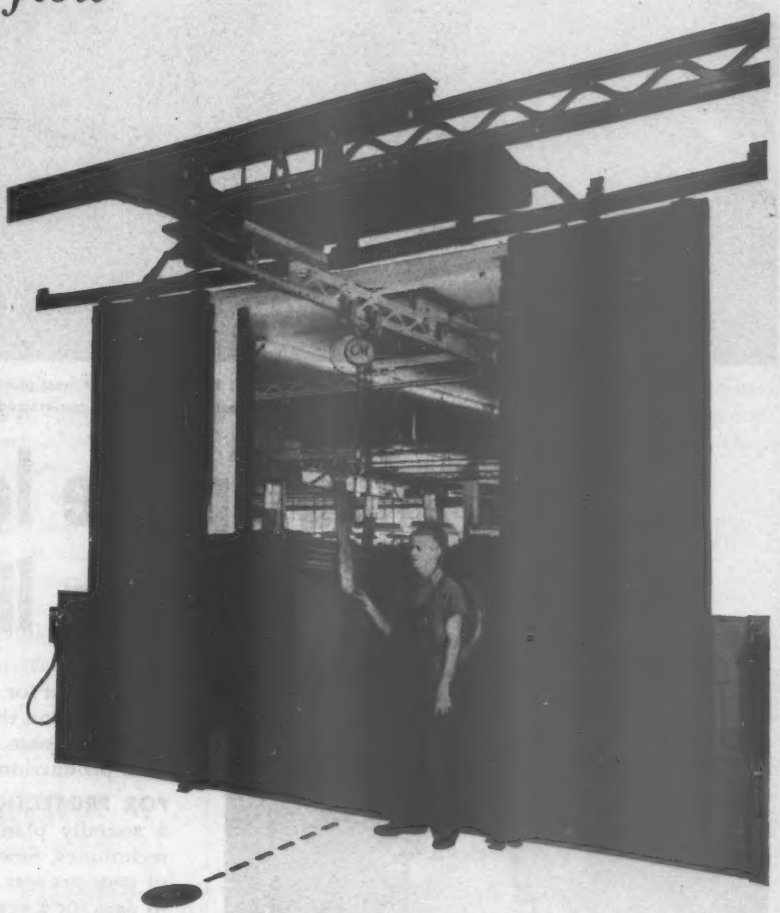
help humidity control... flow

In plants where humidity control is important and where inter-department traffic is heavy, Stanley Magic Doors have proved a profitable investment

As installed in the photo (right), Stanley Magic Doors open promptly, *automatically* for goods traveling on the monorail and for all wheeled and pedestrian traffic. Costly man-hours are saved . . . handling time cut . . . mill output stepped up.

And after all traffic has safely passed, Magic Doors close promptly, *automatically* . . . remain closed when not in use. Heating, humidification and air conditioning systems operate more efficiently . . . working conditions are more comfortable.

Completely automatic door operation — Stanley Magic Doors have solved door and traffic problems in all types of industrial plants, and can do the same for you. Easily adapted to almost any requirement of space and location, Stanley Magic Door Operators can be quickly, easily and inexpensively installed right on your present doors by your own maintenance crew. Send for all the facts.



COMPLETELY AUTOMATIC DOOR CONTROLS FOR SWINGING, SLIDING OR FOLDING DOORS

The Stanley Works, Magic Door Division
300 Lake Street, New Britain, Conn.

☐ Send me full information on Stanley Magic Doors.

☐ Please have your representative call.

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Firm's Name.....

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City..... State.....

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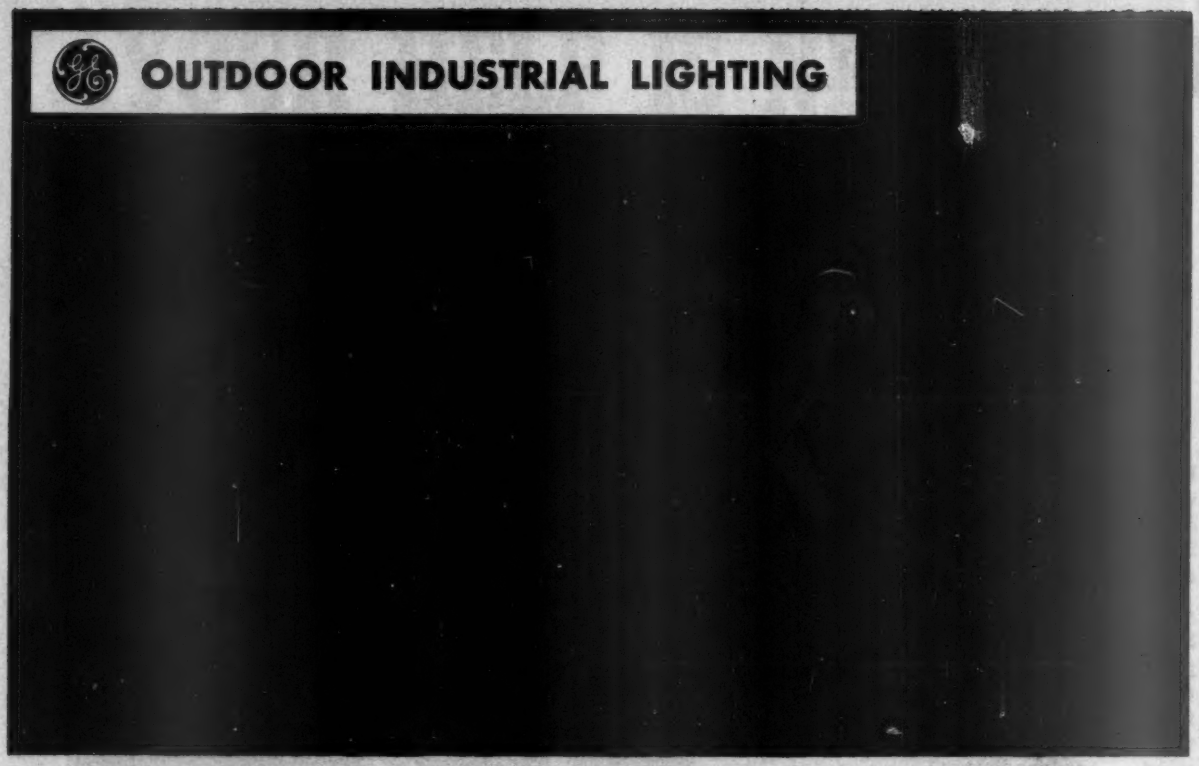
DOOR CONTROLS

"The Magic Door"

HARDWARE • TOOLS • ELECTRIC TOOLS • STEEL STRAPPING • STEEL

OUTDOOR INDUSTRIAL LIGHTING



Inadequate lighting such as this makes it difficult to guard your plant boundaries properly. For a moderate investment most plant protective lighting systems can easily be modernized and made much more effective.

Now, plug up the loopholes in your outdoor lighting

A continuous, well-planned system can double the protection offered by fences and walls. Plan now to give your plant the protection of a complete lighting system.

As the need for protection increases, as you move back into two- and three-shift schedules, a modern outdoor lighting system becomes more and more important to your production picture.

FOR PROTECTION, investigate the low-cost benefits of a soundly planned protective lighting system. New techniques, new types of fixtures, or minor adjustment of your present equipment can bring your lighting up to date for a very moderate investment.

FOR SAFETY in handling outdoor traffic, look into today's techniques of improved area lighting for loading platforms, docks, parking facilities, and roadways.

FOR INFORMATION on outdoor lighting, contact the lighting specialist at your local G-E office, or write for the free bulletin, "Outdoor Lighting for Industrial Plants." Address Section 451-165, General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

451-165

Ideas for better-working papers

WITH STANDARD REGISTER PAPERWORK SIMPLIFICATION

The simplest and fastest way to write important records in the plant also gives you the most useful, *dependable* records. A Standard REGISTER system serves to insure the *accuracy*, the *completeness* of vital orders, reports, requisitions, etc. The guaranteed consecutive numbering of *continuous* forms—the unbroken "audit" copy of all forms written—is positive protection for all vital data.

In a large steel plant, for instance, such a system speeds time and production reports to Production Planning, Payroll, Cost Accounting—and earnings information to workers. The system also saves $15,000 a year in forms cost and clerical labor.

This story and others illustrate how Standard Register Representatives *scientifically* apply labor-saving business forms to customers' particular paperwork problems. They analyze a system with you, to

A. *Develop the best procedure*

B. *Simplify the writing process*

C. *Design the most efficient form*

Put the results together and they spell Paperwork Simplification—less work, better-working papers.

Send for recent issues of our magazine *Paperwork Simplification,* free.

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Please send, without obligation, recent issues of your magazine "Paperwork Simplification."

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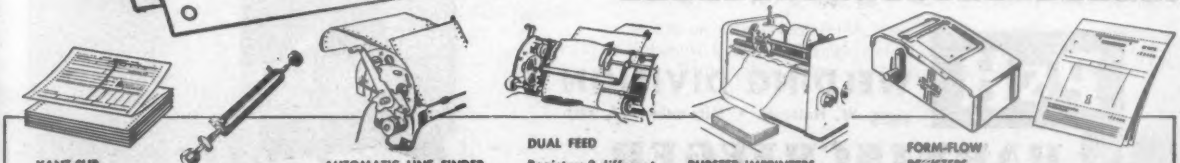


KANT-SLIP continuous forms

Feeding-aligning devices: THE REGISTRATOR PLATEN

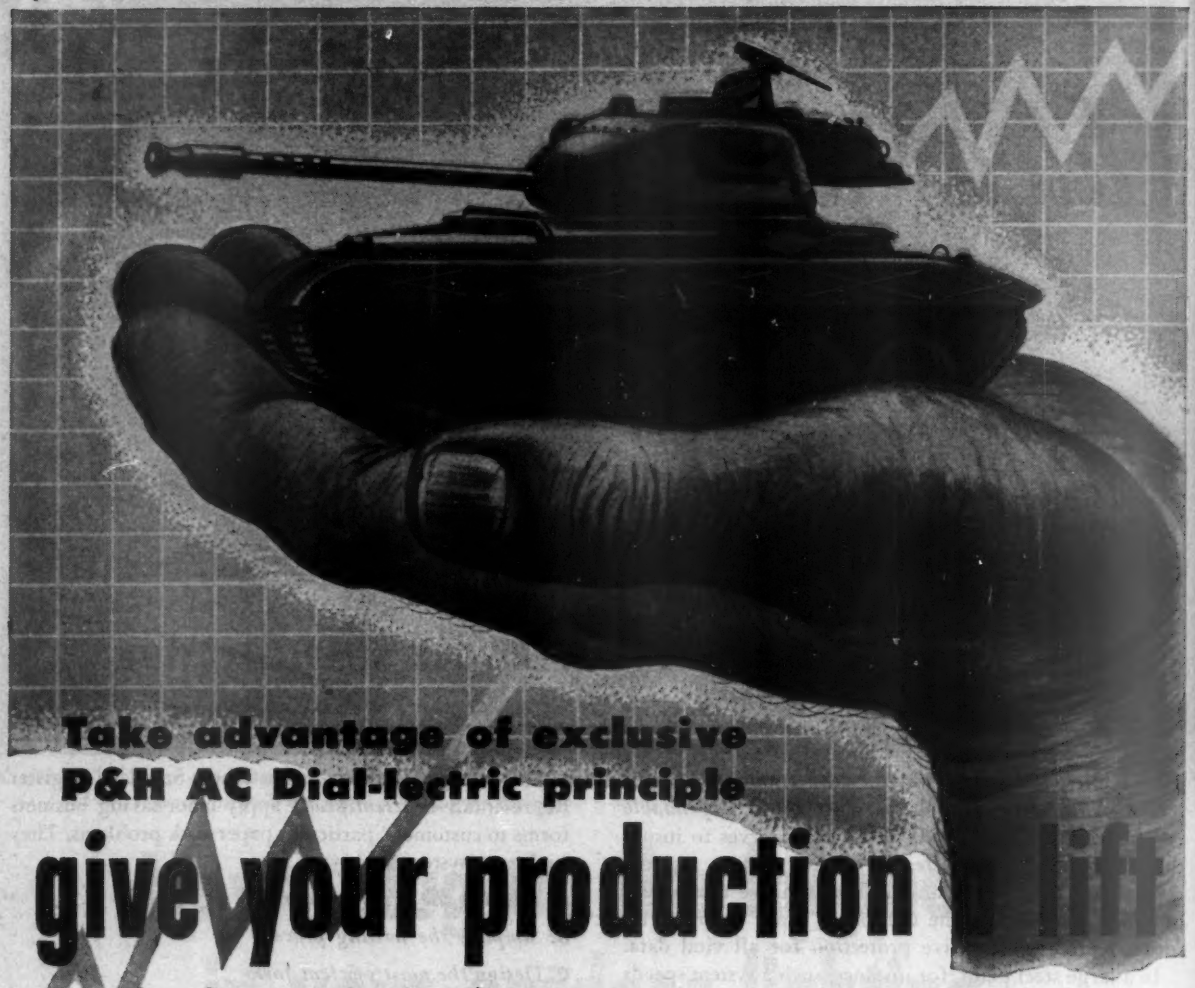
AUTOMATIC LINE FINDER Advances form into new writing position in one motion

DUAL FEED Registers 2 different forms for 1 continuous typing operation

BURSTER-IMPRINTERS Sign, date, number, trim, tear off, stack Kant-Slip forms

FORM-FLOW REGISTERS Better records . . . by hand

UNIT ZIPSET FORMS Carbon interleaved



Take advantage of exclusive P&H AC Dial-lectric principle

give your production a lift

— with safe, open-circuit voltage . . . easy, quick-start arc . . . time-saving, built-in remote control . . . compact AC design

Armor plate welding calls for low-hydrogen or stainless steel electrodes. P&H, pioneer in the low-hydrogen field, also offers the AC welder that gives you the best weldability with these rods — for greater production.

Your men like the P&H AC Dial-lectric — like its safety under the most adverse conditions; like the easy, quick-start arc, the elimination of arc-blow. And they get more done! Get sounder, better looking welds in less time, thanks to built-in remote control which lets them select the right heat at the work, turns *walking time* into *welding time.*

Because these welders give production such a lift, P&H has stepped up its delivery schedules to meet defense demands without delay. Get your production rolling in high gear. Order your P&H AC Welders today. Capacities up to 650 amps. Take advantage of this delivery situation while it lasts.

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4525 W. National • Milwaukee 14, Wis.
HARNISCHFEGER CORPORATION

2350

A Georgia-Pacific "new dimension" in housing

THERE'LL BE A 25 MINUTE WAIT FOR THE NEXT HOUSE!

When enough families are faced with a tough enough problem, somebody usually does something about it . . . even if it takes a miracle. It happened when Gunnison Homes, Inc., a subsidiary of United States Steel Corporation, applied production-line efficiency to home building . . . and a problem was licked for thousands of families.

Today it takes 25 minutes to fabricate all the units for a home on Gunnison's production lines. It can be under roof in one day and completely finished, down to the final coat of paint and flowers in the window box, in less than a week. Think of the labor-saving economy! Besides, quality can be factory-controlled. Typical of this house tuned to the times is its use of the modern miracle material, GPX. Georgia-Pacific's plastic-faced plywood, GPX, is used in Gunnison homes to provide strong, rigid, rugged check-free exterior walls of enduring beauty.

GPX, a smooth, hard material, combines the inherent strength of plywood with the durability of phenolic plastic. It is cutting costs in such diverse uses as furniture, foundry match plates, photo equipment, railway cars, and repetitive concrete forms.

If you have a job where smoothness, lightweight strength and ruggedness pay off, send for the new GPX folder, describing grades and uses—write Georgia-Pacific Plywood Company, 642 North Capitol Way, Olympia, Wash., or get in touch with your nearest Georgia-Pacific office.

GEORGIA—PACIFIC
PLYWOOD COMPANY

OFFICES OR WAREHOUSES IN: Augusta, Birmingham, Boston, Chicago, Columbia, Louisville, Memphis, Nashville, Newark, Olympia, Orlando, Philadelphia, Pittsburgh, Raleigh, Richmond, Savannah

DOUGLAS FIR PLYWOOD • HARDWOOD PLYWOOD • GPX • SOUTHERN & WESTERN LUMBER • DOORS

BEFORE VIEW

THESE "before" and "after" photographs of the Rosemary Manufacturing Company, Roanoke Rapids, N. C., show how large areas of outworn window sash were replaced with modern PC *Fenestra* Glass Blocks. Here, they admit abundant, scientifically-directed daylighting. Partial replacement, made possible by PC Glass Blocks, meets budget limitations.

Sash replacement with PC Glass Blocks is adaptable to budgets ... saves you money!

Complete sash replacement can be done at one time, or the program can be extended over long periods, when PC Glass Blocks are utilized. Whether your budget is large or small, that's an important consideration in replacing worn window sash. And PC Glass Blocks offer you real money-savings. They seldom require repairs or replacements. No metal or wood sash is involved, to rust, corrode, rot or decay. There's no periodic and expensive painting and puttying. They cut maintenance costs. And, because they have more than twice the insulating value of ordinary single-glazed windows, heating and air-conditioning costs are reduced. Why not consult with our specialists regarding your particular sash replacement needs? Meanwhile, send for our free booklet.

PC Glass Blocks are immediately available ...no construction delays!

Pittsburgh Corning Corporation
Dept. P-121, 307 Fourth Avenue, Pittsburgh 22, Pa.

Without obligation on my part, please send me a FREE copy of your booklet, "The Mark of a Modern Building—PC Glass Blocks."

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PITTSBURGH CORNING CORPORATION
PITTSBURGH 22, PA.

PITTSBURGH PC CORNING ® GLASS BLOCKS
The mark of a modern building

Distributed by Pittsburgh Plate Glass Company; W. P. Fuller & Co. on the Pacific Coast; Hobbs Glass Ltd. in Canada; and by leading distributors of building materials everywhere.

BRITEWAY

The Liquid Soap Floor Cleaner Used With Hard Or Soft Water

Economical! one cup to a pail of water

Looking for an all-purpose liquid soap cleaner that will do its job well under all conditions? The answer is BRITEWAY, Dolge-developed and tested to surmont hard-water and temperature-change barriers.

BRITEWAY will not separate, jell or harden even in sub-zero weather. Just put one economical cupful in a pail of water and watch it "suds-up" into a rich, cleansing lather. Approved by the U. S. Rubber Flooring Manufacturers Assn., for use on rubber floors. Excellent, too, for linoleum, mastic, wood — and painted or varnished surfaces.

Won't separate or freeze even at 16 below!

On floors, apply BRITEWAY with a mop; on walls with a cloth. Just rinse off, and your job's done! BRITEWAY removes RUBBER BURNS completely!

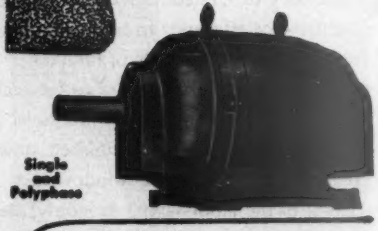
Your Floors—and Walls—Will Appreciate

BRITEWAY

dependable DOLGE

WESTPORT, CONNECTICUT

CUSTOM-BUILT—
NOT CUSTOM PRICED



Single and Polyphase

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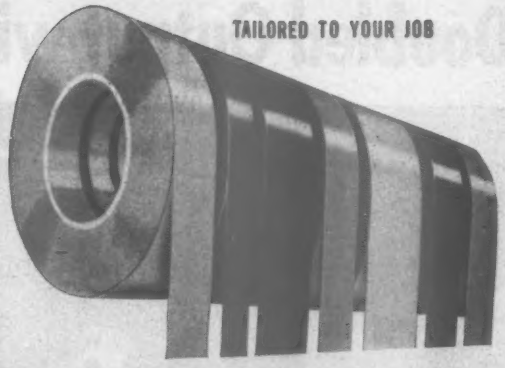

Wrapping high-tension cables with only ONE tape! Here you see this revolutionary new electrical tape in action. *One* tape instead of two. *One* coating of Polyken plastic tape instead of rubber tape and friction tape. Lower tape costs. Half the labor in applying the tape.

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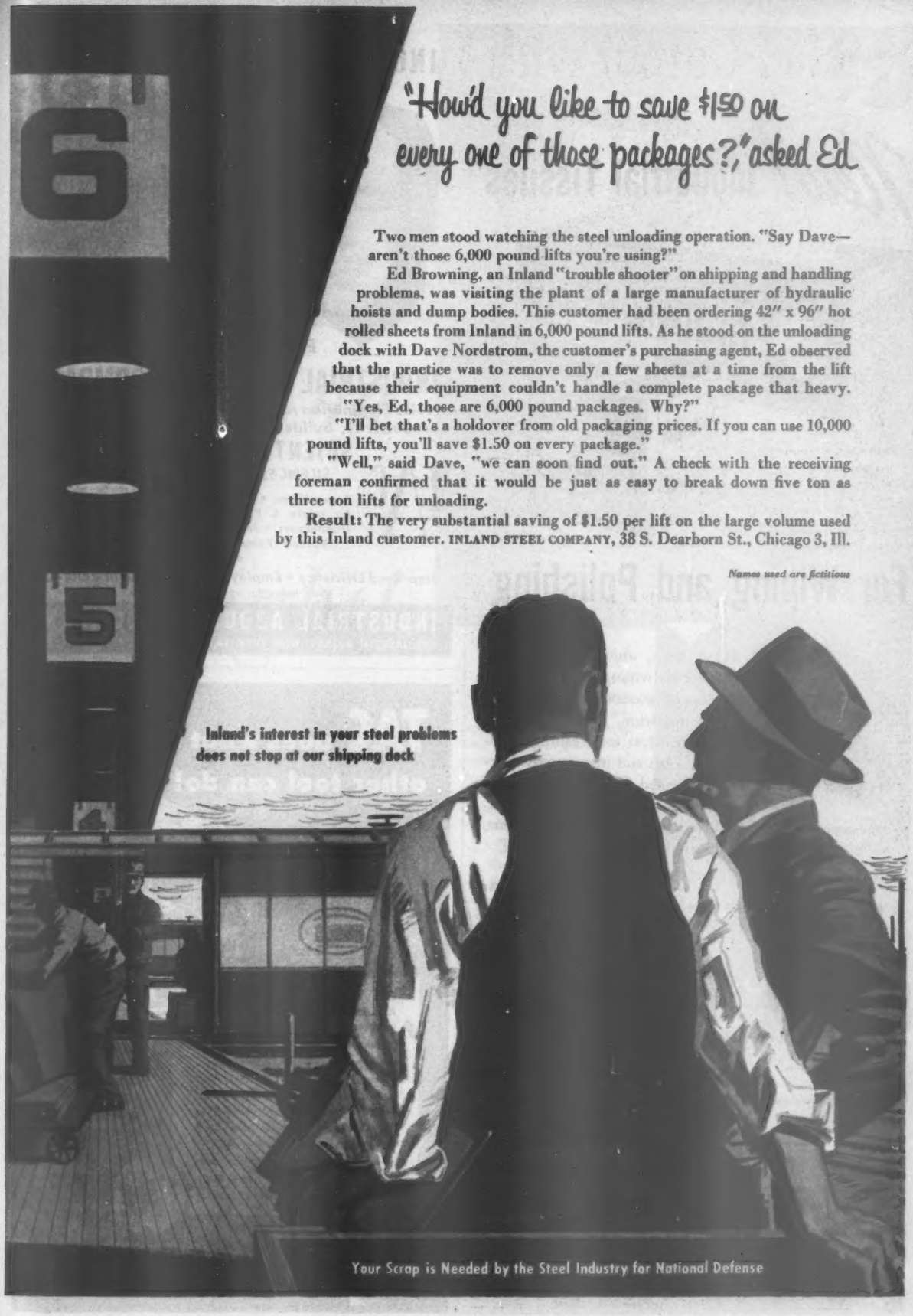

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Photo at right shows how well a single Skydome unit daylights the area where incoming and outgoing shipments are checked.

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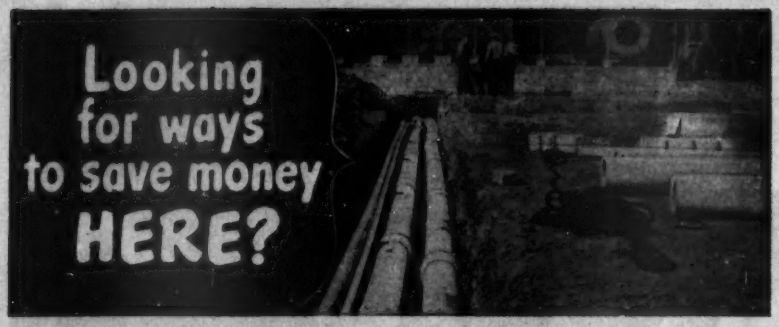

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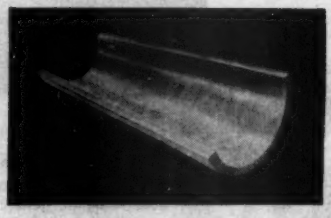
REDUCES INSTALLATION COSTS—Your water line goes in fast when you use Transite Pressure Pipe. Crews can lay more pipe per day because Transite is light in weight, easy to handle . . . and Transite's special factory-made joints are simply *assembled* on the job. Time and labor are saved, haulage and installation costs are reduced.



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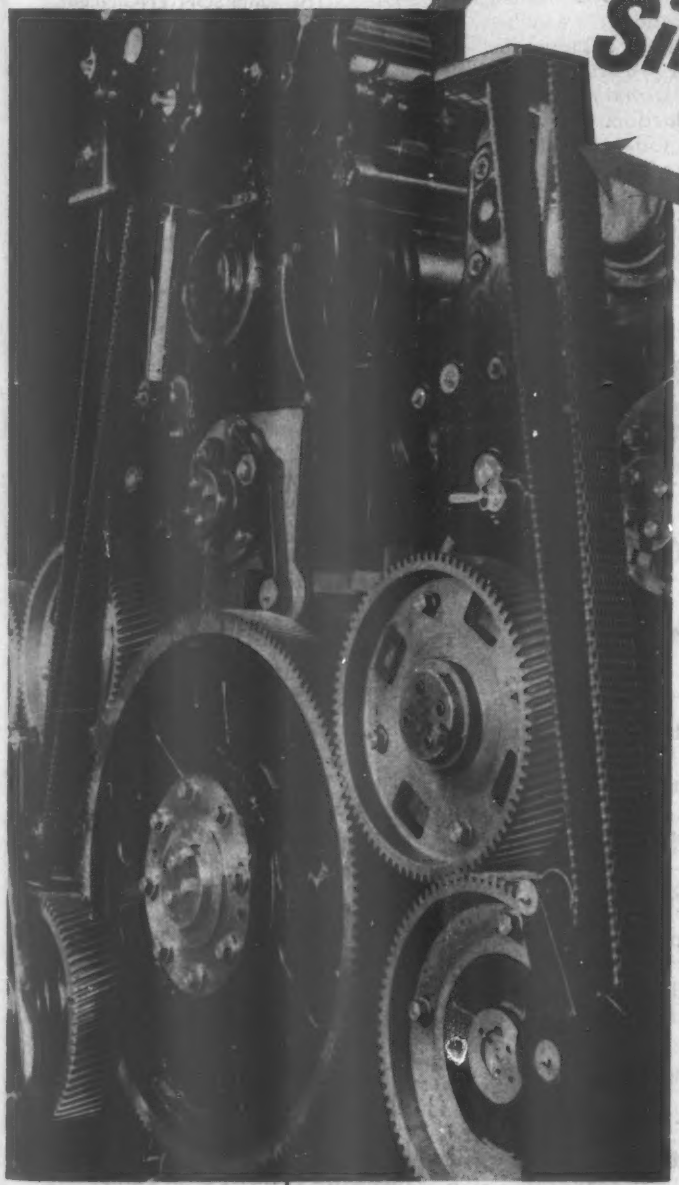

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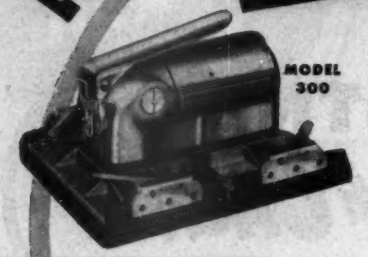

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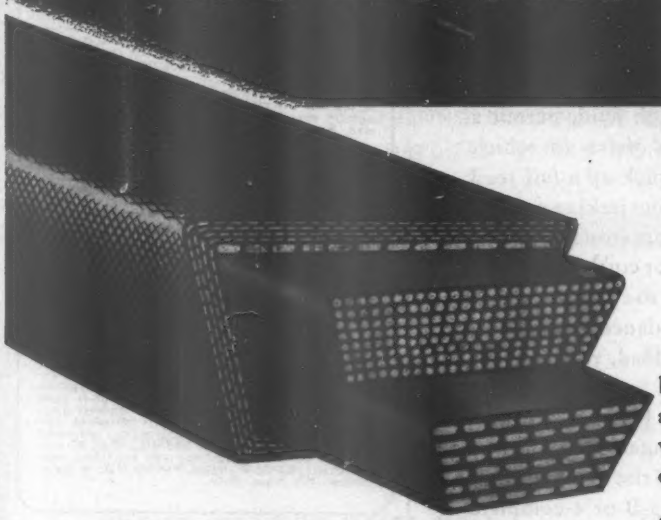

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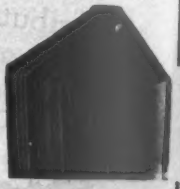

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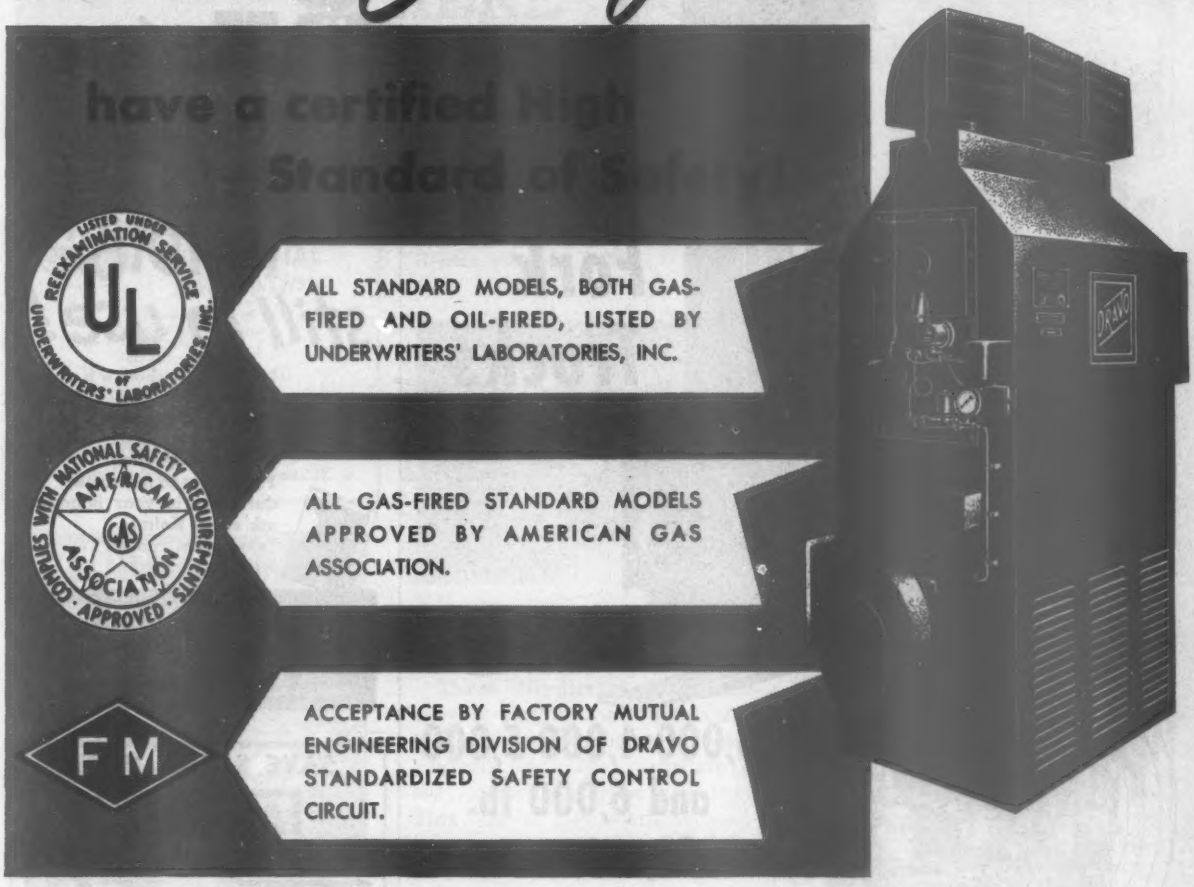
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No question about a Kalman Concrete floor's ability to "take it". Testimony tells again and again of Kalman ruggedness. For the key to maximum durability in your flooring, ask about Kalman "absorption control" — write for bulletin.

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SAVE SPACE WITH FAB-WELD ALL-STEEL PALLET RACKS

Every inch of available storage space is made possible by using FAB-WELD All-Steel Pallet Racks. Designed for palletized unit loads. Rugged construction for all ceiling heights.

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Steel Pallets • Collapsible Bin Boxes • Special Stackable Pallets • Dump Hoppers • Skids and Bin Boxes • Car Bridge Plates • Heavy Duty Industrial Trailers • Floor Trucks

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RICHMOND & VENANGO STS.
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Featuring many cost-cutting products to help solve production problems

BALDWIN-HILL INSULATIONS

INDUSTRIAL INSULATION

A complete line of
Mineral Wool Insulations
for service from
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Mono-Block, Felts, Blankets,
Koldboard, Pipe Covering
B-H No. 1 Cement
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STANDS 50,000 LB. LOADS
60 seconds after application
SWIFT-FLOOR
FLOOR RESURFACER
MONROE MAINTENANCE MATERIALS
THE MONROE COMPANY, INC.
CLEVELAND 6, OHIO

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SELF-CLOSING OILY WASTE CAN
U.L. and F.M. Approved

Reduces hazards of spontaneous combustion from rags, paper and other similar flammable wastes. Constructed of heavy terne plate with welded seams for ruggedness . . . wide, hard-to-miss mouth opening . . sides extended to floor for stability . . . full-width treadle for easy, one-foot operation from any angle . . full-hinged self-closing cover to smother fires . . . bottom raised for ventilation . . . and rounded corners for easy cleaning. Capacities 6 to 14 gallons. Ask for detailed bulletin.

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1962 S. WESTERN AVE. • CHICAGO 8, ILL.

THIS PAGE IS BEING READ!

by most of the 52,900 plant operating men who pay to get FACTORY every month. Your ad in this space will be read by these same important buying influences. Start making sales contact with them at once.

MISCELLANEOUS EQUIPMENT

Begins on page 192

Accounting Cards for Small User

These Needlesort cards provide a simple method of time keeping for production records, payrolls, etc. The cards are of the marginally-punched type. This type of punchcard accounting is not new. But the Boeckeler people claim that their Needlesort cards are the first available to small users in small quantities at low cost.

The body of the card provides space for recording production data. But around the margin the cards are perforated with a series of holes. Each hole represents a quantity or factor such as employee name, job number, lot quantity, etc.

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Made for every type of leak—any temperature or pressure. Send for Catalog No. 41-0.
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SILVER SODERING
BRAZING
WELDING

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DUSTKOPS
UNIT TYPE
LOW COST

22 Models
300 cfm to 10,000 cfm
¼ hp to 15 hp.

AVAILABLE FROM STOCK
For: Grinders, buffers, polishers, woodworking, lint . . . ALL DUSTS
Send for Cat. 605f; describe problem for recommendation by return mail, without obligation
AGET-DETROIT CO. • ANN ARBOR, MICH.

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Curve, straight, irregular—every shape cut accurately. Precision circles any size from ¼" to 6". This accurate, practical tool is needed in every tool kit for gaskets, discs, shims, patterns, designs, odd shapes and straight strips from cloth, board, fibre, foil, leather, rubber, paper or any pliable sheet material. Sturdy construction. Easy to use. Thousands in use by individuals and largest concerns. Complete with cutting board, blades, pivot pins—only $7.80 postpaid (Check or money order) on money-back guarantee of satisfaction. Send for your Spearhead Cutter TODAY. Also available up to 60" capacity.

ZIMMERMAN PACKING CO.
Dept. 29, Spearhead Div., Cincinnati 12, Ohio

SLASH MAINTENANCE PAINTING COSTS...

UP TO 40%

Enterprise
STAIZE-CLENE
THE NEW MIRACLE DIRT REPELLING DISCOVERY

World's Only Paint Made With Patented **SYNCON***

*Made Under U. S. Patent No. 2,353,910

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Compare the advantages STAIZE-CLENE gives you over any other paint. Weigh its dirt resistant qualities —note its better coverage—the fact that it goes farther —consider its high resistance to fumes—this will tell you why STAIZE-CLENE with Syncon has been hailed as the greatest improvement in paint in the last 20 years!

Send for the FREE STAIZE-CLENE Manual—"How You Can Reduce Your Maintenance Painting Cost," and learn how you can make substantial savings with this unbeatable maintenance finish.

MAIL THIS COUPON TODAY!

ENTERPRISE PAINT MFG. CO.
Dept. S.C. FM-12
2841 S. Ashland Ave., Chicago 8, Illinois

Please send me the FREE Manual—"How You Can Reduce Your Maintenance Painting Cost."

Name_____
Firm_____
Address_____
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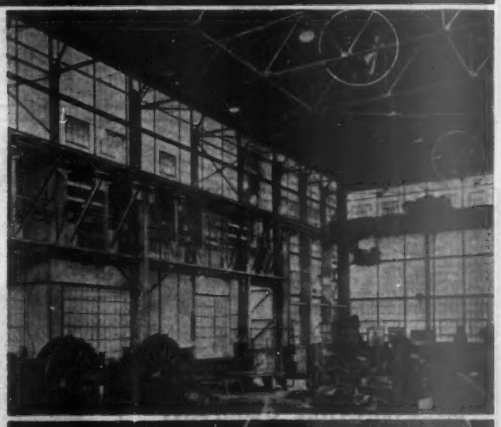
The Discharge Outlets of all these Heaters REVOLVE . . . Why?



The buildings illustrated in this ad have one thing in common—comfortably, thoroughly, pleasantly heated by Wing *Revolving* Unit Heaters. From gigantic railroad terminal and high-ceilinged factory to railroad repair shop, working conditions are ideal because the heated air from overhead is circulated slowly and uniformly in gently revolving streams. Isn't that the sort of heating you want in *your* plant? Get the details. *Write for bulletin.*

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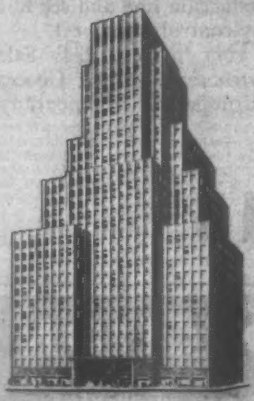
Linden, N.J.
Factories: Linden, N.J. Montreal, Can.
In Europe: WANSON
Brussels, Belgium

Sunshine Biscuits, Inc., Kansas City, Mo.—Architects: Engineering Dept., Sunshine Biscuits, Inc.
General Contractors: Swenson Construction Co., Inc.
Electrical Contractors: J. H. McKay Electric Co.

First National Building, Tulsa, Oklahoma
Architects: Carson and Lundin
General Contractors: Manhattan Construction Co.
Electrical Contractors: J. Livingston and Co.



The Mutual Life Bldg., New York, N. Y.
Architects:
Shreve, Lamb and Harmon Associates
General Contractors: Turner Construction Co.
Electrical Contractors: Lord Electric Co., Inc.

Statler Center, Los Angeles, California
Architects: Holabird and Root and Burgee
Associate: William B. Tabler
General Contractor: Robert E. McKee General Contractor, Inc.
Electrical Contractor: Stetson Electric Company

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serves industries and institutions from coast-to-coast

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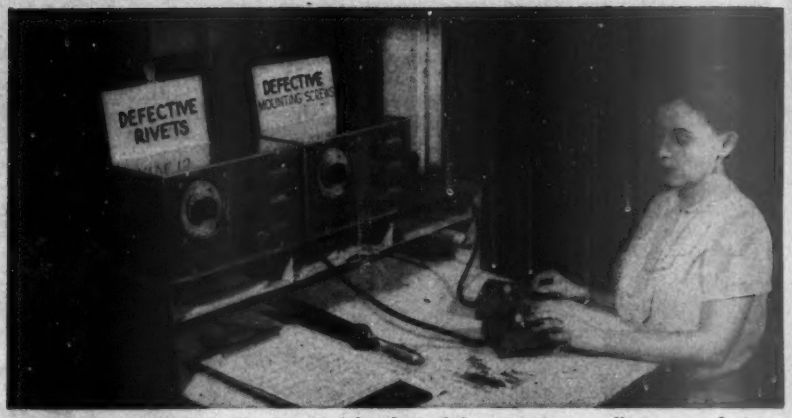
IBM
TRADE MARK
Time Control

INTERNATIONAL BUSINESS MACHINES

590 Madison Avenue, New York 22, N. Y. • Branch offices throughout the United States

New! CONTINUOUS SAMPLING MONITOR



G-E Continuous Sampling Monitor used in plant of large eastern appliance manufacturer.

Insures Your Average Outgoing Quality Limit

Now you can keep track of complex inspection techniques with the Continuous Sampling Monitor . . . newest addition to the General Electric line of instruments developed to improve your quality control program.

By recording units accepted and rejected, the Continuous Sampling Monitor informs the inspector whether periodic sampling, or 100% inspection is required.

The AOQL (average outgoing quality limit) is thus insured by maintaining correct inspection techniques.

- **Ends "paperwork" by inspectors**
- **Reduces inspection time**

Look into the advantages of a Continuous Sampling Monitor. Try one on your production line and see how your quality control improves!

Contact your nearest G-E Sales Office, or write Sect. 687-77, General Electric Company, Schenectady, New York.

GENERAL ELECTRIC

687-77

THE U. S. NAVAL AIR ROCKET TEST STATION HAS SEVERAL VACANCIES IN THE ENGINEERING DEPARTMENT

Aeronautical Engineer—GS-12, $7040 per annum—Duties: Head of Evaluation Branch, power plants division of the Engineering Dept. Directs specialized investigations of the performance of rocket engines, rocket power plants, or their components.

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General Engineer—GS-9, $5060 Per Annum—Duties: Project Engineer in Facilities Branch, Engineering Dept. The Facilities Branch makes plans, procures and installs equipment for new testing facilities. The work covers all phases from initial planning and layout of actual installation.

Aeronautical Engineer—GS-9, $5060 Per Annum—Duties: Project Engineer in the Evaluation Branch, power plants div., of the engineering dept. Conducts specialized investigations of the performance of liquid propellants rocket engines, rocket power plants, and their components.

Illustrator (Equipment) GS-6, $3795 Per Annum—Duties: Illustrator in the Drafting Section of the engineering Dept. Makes original illustrations of mechanical equipment & layout of technical reports and preparation for publication.

Applicants should submit standard form 57, application for federal employment, which is available at any post office, and forward to:

The Industrial Relations Officer
Industrial Relations Department
U.S. NAVAL AIR ROCKET TEST STATION
Lake Denmark, Dover, New Jersey

DESIGN ENGINEER

For an established, permanent engineering group in a process industry. An excellent opportunity for right man to handle project engineering work for a chemical manufacturer, including pumps, piping, steel, chemical plant equipment, etc. Modern plant, good working conditions, located in a desirable, small eastern community.

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330 West 42 St., New York 18, N. Y.

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT: BUSINESS: **"OPPORTUNITIES"** :EQUIPMENT :USED OR RESALE

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UNDISPLAYED

$1.50 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Positions Wanted and Individual Selling Opportunity undisplayed rate is one-half of above rate, payable in advance.

Box Numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Equipment Wanted or For Sale Advertisements acceptable only in Displayed Style.

DISPLAYED

Individual Spaces with border rules for prominent display and advertisements.

The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column. 3 columns—30 inches—to a page.

New Ads received by December 14th at the N. Y. Office, 330 W. 42 St., N. Y. 18, will appear in the January issue subject to space limitations.

REPLIES (Box No.):
Address to office nearest you
NEW YORK: 330 W. 42 St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

SELLING OPPORTUNITIES OFFERED

SALESMAN NOW Calling on Industrials, Utilities, Institutions, Hotel Chains, State Municipalities, Government Agencies etc. Carry brand new Silicone Resin type Transparent Waterproofing for masonry. High additional income possible. Attractive commission. State line now carrying. Territory Mass., Maine, N. H. & Vermont. SW-2341, Factory M & M.

SELLING OPPORTUNITY OFFERED

SALESMAN WANTED to call on the industrial plants with nationally advertised work glove line in Midwestern and Southern states. Salesman carrying non-conflicting line eligible. Commission basis. Please contact David Ritoff, David's Gloves, Inc., 23 West Pleasant Street, Springfield, Ohio.

EMPLOYMENT SERVICE

SALARIED PERSONNEL, $3,000-$35,000. This confidential service, established 1927 is geared to needs of high grade men who seek a change of connection under conditions assuring if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. D, 241 Orange St., New Haven, Conn.

SAFETY ENGINEER

Opening for a Safety Engineer. Position involves all phases of plant safety program. Prefer Chemical Engineering or related training. Salary commensurate with training and experience.

BRISTOL LABORATORIES, INC.
SYRACUSE, N. Y.

When Answering
BOX NUMBERS . . .

to expedite the handling of your correspondence and avoid confusion, please do not address a single reply to more than one individual box number. Be sure to address separate replies for each advertisement.

SALARIED POSITIONS $3,500 — $35,000

We offer the original personal employment service (established 41 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars.

R. W. BIXBY, Inc. 276 Dun Bldg., Buffalo 2, N.Y.

EXECUTIVES AND TECHNICAL MEN

Desiring Positions with Stability

We solicit inquiries from qualified candidates who desire to contact employers for positions paying $5000 to $25,000 per year. Confidential Est. 36 years.
(Inquiries from Employers entail no obligation)

THE NATIONAL BUSINESS BOURSE
20 W. Jackson Blvd., Chicago 4

POSITIONS AVAILABLE

President and General Mgr.—Heavy Mfg. $35,000; Administrative Vice Pres. Utility $20,000; General Manager—Mfg. $25,000; Factory Mgr. Refrigerators $11,000; Compressor Engr.—Ass't. Chief $8000; Chief Engr. $10,000. Many other positions for Technical Men. We have specialized in Executives & Technical men since 1915. Write for application. Employer pays fee most cases.

HARRISON PERSONNEL SERVICE
20 W. Jackson Blvd. Chicago 4

REPLIES (Box No.):
Address to office nearest you
NEW YORK: 330 W. 42 St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

EMPLOYMENT SERVICE

(Continued from opposite page)

EXECUTIVES—CONTEMPLATING a change? Your personal requirements met thru our flexible procedures, affording full protection of your present position. We have the know-how and the nationwide contacts to negotiate successfully for you. Details on request, mailed under confidential cover. Jepson Executive Service (Est. 1939). 1048 Porter Bldg., Kansas City 2, Mo.

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INDUSTRIAL ENGINEER—thoroughly experienced in processing, methods, routing, incentives and production control in machine tool industry. Capable of independent constructive thinking. College educated. Age 37. Salary range $6000-$7000. PW-2455, Factory M & M.

EXECUTIVE ENGINEER, offers unusual combination of administrative, development, design, and research capabilities in rotating machinery, auxiliary, and plant engineering fields. Masters degree (Mechanical), 41, married. PW-2559, Factory M. & M.

INDUSTRIAL RELATIONS Director. Eleven years Automotive and Aircraft experience Labor Relations, Contact Negotiations, Personnel, Employment, Medical, Safety, Plant Protection, Time Study and Standards, Piece Work Rates and Job Evaluation. PW-2464, Factory M & M.

PLANT MANAGER. Present Assistant to Works Manager of large machine tool maker desires position as manager of small plant or assistant manager of large plant. 41 years of age. 7 years shop experience as machine operator, inspector, assistant chief inspector, general foreman, superintendent. 7 years staff experience as process engineer, manager of methods, chief standards engineer, assistant production control manager, advisor to management. PW-2503, Factory M & M.

Position Wanted

YOUNG TOP-Notch production executive available. Prefers N.E. Salary $25,000 plus bonus. PW-2529, Factory M. & M.

SPECIAL SERVICE

Time Study Equipment

Boards with U.C.E.Z. transparent watch holders. Stop Watches. Pedometers, Slide Rules. Time Study forms in stock. Sample kit free. Onam Products Co., 5544 So. Homan Ave., Chicago 29.

CLOGGED DRAINS?

Tree Roots — Hard Grease — Rust — Rags, Etc. Can be removed easily from 2"-6" sewers with our 1A Electric Drain Cleaner.

Write for Catalogue

ELECTRIC SEWER CLEANING COMPANY
Boston 34 Massachusetts

AIR COMPRESSORS
VACUUM PUMPS
REBUILT BY AMERICAN
"THE FINEST IN 50 YEARS"

Your Choice	STATIONARY
American Bury Chicago Pneu Curtis Davey Gardner Denver Ingersoll Rand Le Roi Pennsylvania Schramm Sullivan Worthington	Horizontal Vertical Electric Steam
	PORTABLE
	Gasoline Diesel Pneu Tires Skids Steel Wheels

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FOR RENT—ANY ONE OF OVER 200 COMPRESSORS IN STOCK

Since 1902
AIR RECEIVERS - AFTERCOOLERS
AMERICAN AIR COMPRESSOR CORP.
4700-4900 Dell Ave. No. Bergen, N.J.

FOR SALE

Used 400-ton George Ohl Press Brake. Capacity ¾" steel plate, 12'6" long, 4" stroke, 4" ram adjustment. Cast Iron frame and housings. Motor 20 H.P. 3-phase, 25-cycle, A.C. 220-volt, 720 R.P.M. with resistors and controls. Filler block and upper and lower dies.

WRITE J. P. BEYSER, WORKS MANAGER,
BUFLOVAK EQUIPMENT DIVISION OF
BLAW-KNOX COMPANY
1543 Fillmore Ave., Buffalo 11, New York

FOR SALE—2 Roll Cloth Calender

Single nip with 12" dia., 80" face, cored steel roll, 24" dia. husk and cotton roll. Screw loaded with 3 H.P. motor. Powered by 20 H.P. motor. Both Westinghouse Induction Type CS, 220V, 3 phase, 1700 R.P.M. Equipped with Speed Reducer, Cleveland Worm Gear Series 7, Ratio 33 to 1, H.P. 15. Will sell items separately or as complete unit.

Crawford Manufacturing Co., Inc.
Richmond, Va.

BALL for NEW and USED MACHINE TOOLS
BALL MACHINERY CO.
713 W. LAKE STREET, CHICAGO 6, ILLINOIS
BOUGHT AND SOLD

WANTED
Bridge Cranes
ARNOLD HUGHES COMPANY
765 Penobscot Bldg., Detroit, Mich.
WOodward 1-1894

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by MATTHEW A. PAYNE

68 page booklet believed to be the most comprehensive treatment of the fatigue allowance in print.
$2.50 plus 6¢ postage in U.S.

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For Personnel, Safety, Maintenance, Sales Training, or Entertainment. The new 5th edition of "Sound Slidefilm Guide" is fully descriptive of each title. Only $1.00. See your dealer or write Dept. FM 121.

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FOR SALE

1 Phase, 60 Cycle

3—500 KVA G-E 66000—2300
2—500 KVA W-H 13200—240/480
3—400 KVA W-H 13200—600/575/550
1—400 KVA G-E 13200—120/240 Pyranol
3—333 KVA G-E 44000—6600
3—250 KVA W-H 13800—2300
3—200 KVA G-E 13200—120/240
3—250 KVA Kuhl 6600—575
3—150 KVA G-E 44000/33000—2400/500
3—150 KVA Pitts 22000—575
3—150 KVA G-E 19050/33000Y—2540/2300
3—150 KVA A-Ch 13800—2300
3—100 KVA G-E 33000—6900/11950Y
3— 50 KVA G-E 33000—2400/4160Y
3—100 KVA G-E 2400—240/480, 25 cycle

Many other items in stock

TRANSFORMERS WANTED

Reliable rewind and repair service on all makes of transformers

THE ELECTRIC SERVICE CO.
CINCINNATI 27, OHIO

CONVEYOR

Trolley Chain with 4" I beam track. 850 feet. 80# load per foot with many vertical bends and radius roller turns, with 425 ball bearing trolleys and carrying attachments, with floating caterpillar drive. Complete in every detail. Used very little, just like new. Inquire,

INTEGRITY SUPPLY INC.
305 North Front St., Columbus, Ohio
Phone, Main 6371

FOR SALE

1 Transformer, 1500 KVA, GE, Type HT, Form D, Pyronal, oil cooled, 3 phase, 60 cycle, 11,000V primary, five taps to 9900V-480V secondary, outdoor style, self-cooled, excellent condition.

Also, one Baldwin-Westinghouse 300KW 115/230V DC Diesel Generator and various motor generator sets

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Welding Shipyards
Box 1860 Norfolk 1, Virginia

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BRIDGE CRANES
ARNOLD HUGHES COMPANY
765 Penobscot Bldg., Detroit, Mich.
WOodward 1-1894

MOTORS, GENERATORS, TRANSFORMERS
1 — 1500 H.P.
Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N.Y.

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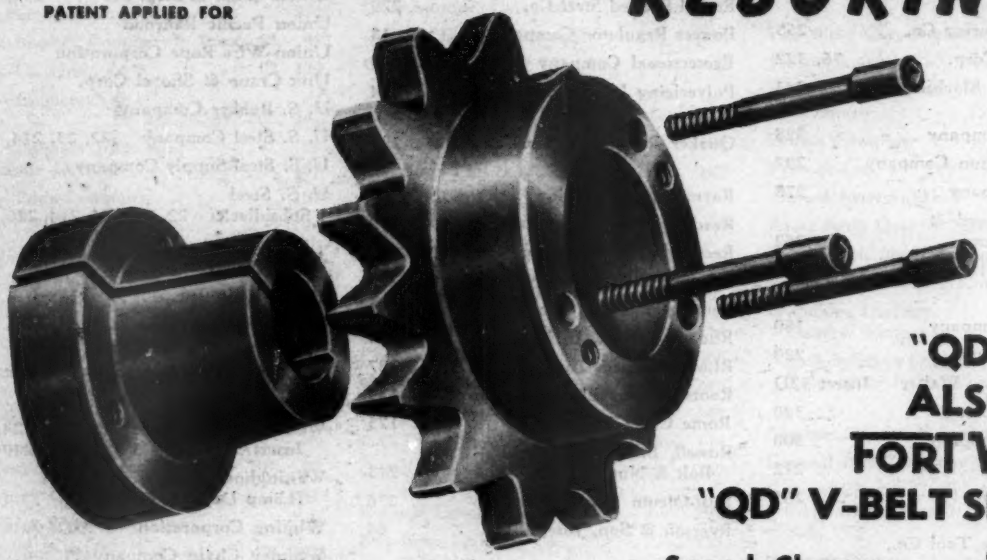

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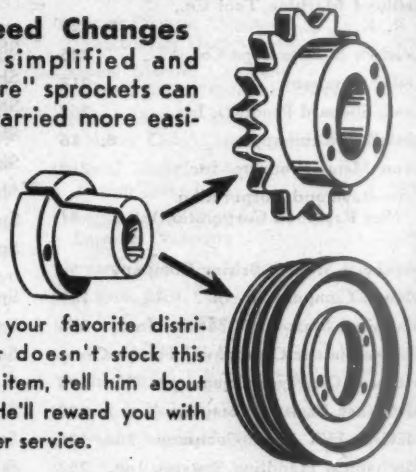

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